THE

Practical Teacher

A MONTHLY EDUCATIONAL JOURNAL

Edited by JOSEPH HUGHES.

'*Knowledge is proud that he has learned so much,*
Wisdom is humble that he knows no more.'—COWPER.

VOL. II. No. 8. OCTOBER, 1882. PRICE 6D. POST FREE, 7½D.

School Surgery.

BY ALFRED CARPENTER, M.D. (LOND.), C.S.S. (CAMB.),

Vice-President of the British Medical Association.

VIII.

DISEASES OF THE SKIN—*(continued).*

IT will be right before dismissing the subject of skin disease to lay down some general rules of diet and some directions which may be observed in most cases of the kind.

Breakfast should consist of bread and milk, or rice-milk, eggs, fresh fish, and bread and butter. Tea and coffee are best avoided.

Dinner should be plain roast or boiled fresh meat, fish, poultry, milk and egg puddings. Farinaceous puddings, boiled rice, potatoes and fresh vegetables, as fresh beans, cauliflower, etc., well cooked.

The evening meal should be milk or gruel, or other farinaceous food, bread and butter, poached eggs, toasted bread, perhaps a little cream cheese. It is better to avoid other kinds of cheese. Barley-water, thin water gruel, beef tea, and any of the mineral waters which are usually drunk should be the only beverages. Whilst salt meats, pepper, pastries, raw vegetables, spirits and malt liquors are not to be touched.

It will be right also to give a few directions as to clothing. The first condition to be observed is, that cleanliness of person shall be rigidly observed, and although flannel is sometimes necessary to be worn, it is not always judicious when there is the least discharge of moisture or exfoliation. It is best to wear soft linen next to the skin. It is not a good plan, however, to wash over diseased skin more often than is absolutely necessary, but other parts should be washed frequently, using as little soap as possible; whilst it should never be used at all on the diseased surface. The scalp may be cleansed with yolk of egg and warm water, and other parts of the body when diseased are more satisfactorily treated with thin gruel, or oatmeal and water, or water in which bran has been boiled, or even warm milk and water may be used. In drying diseased skin, it is very necessary to avoid friction. Use soft linen for the purpose, and dab it, rather than u any kind of scrubbing process. By this kind of tr ment we may avoid injury to the new skin, so as not to displace the altered parts until a new formation has taken place. Ointments and greasy lotions may be removed by these kinds of application better than by any other means, although poultices are sometimes necessary.

ABSCESS.

Abscess.—It is not uncommon to find a child suffering from the effects of an abscess, or gathering (as it is often called), in different parts of the body; an inflamed part is said to suppurate or gather when it softens in the centre and matter or pus collects in it. It is one of the results of inflammation, and may take place anywhere. In some parts they are comparatively unimportant; in others they are highly dangerous, and must not be neglected. Matter forms in the first instance in consequence of some defective vitality in the part affected. The white corpuscles which are contained in the blood, wander out of their usual channel, and become deposited in the part which has a lower vital power. The depressed vitality may have been produced by injury, or over-excited action, or by close proximity to some other damaged part and in which the mischief extends by simple contact. The symptoms which indicate the formation of matter divide themselves into two classes, (1) those which are acute or rapid in their development, and (2nd) those which are chronic or of slow growth. In the first class of cases, there are the usual symptoms of inflammation, heat, swelling, pain, and as the matter approaches the surface, redness. When suppuration has really commenced, the pain gradually loses its acute form, and becomes more dull and throbbing; the hardness, which was considerable at first, decreases; the swelling becomes softer and an elevation takes place in the skin, which indicates that the matter is pointing to the place at which the abscess intends to open; the point assumes a conical form, the skin reddens and becomes thinner, and at length the abscess discharges a quantity of pus, or matter and the swelling subsides at once. If the suppuration is considerable, or if the part suppurating is a very sensitive one, there is more or less constitutional disturbance. The fact of suppuration is preceded by a shiver or rigor, and some ess, which is indicated by quick pulse, hot furred tongue, with loss of appetite and

general *malaise*, which will be more or less according to the character of the abscess. The discharge of the matter from the abscess will be followed at once by the diminution of the constitutional symptoms.

In *chronic abscess* the constitutional symptoms set up are often very slight; sometimes a very large abscess forms without producing any apparent change, and one is surprised at the quantity of matter which may escape, either by accident or design, from a given swelling. It is necessary to determine the nature of a given collection of matter before deciding as to treatment. If it is the sequence of an accident, and the result of neglect, very simple means are requisite for its cure, unless the constitution of the child is bad, and the surroundings at home in an insanitary condition; in that case, very slight injuries and small abscesses may lead to very serious results. It is a very common idea to suppose that it is best to open a gathering and let out the matter as soon as possible; some surgeons even are always glad of the opportunity to use the knife. This is an error. There are occasions when it is right and justifiable; but, as a rule, nature will do the work better than the surgeon, and the discharge will take place at the proper time and in a proper manner. The discharge may be assisted by poultices, but their use is as often mischievous as beneficial. They should only be used when the skin is sensitive, when there is increase of swelling, and redness commencing, and some tension of the neighbouring parts. As soon as the discharge has been free, and the inflammatory tenderness has subsided, the poultice should be left off, and some antiseptic dressing applied and treatment pursued as directed in the case of boil or carbuncle. There are five different conditions in which it may be prudent to obtain the surgeon's aid in the treatment of an abscess. (1.) When matter forms beneath fascia or dense ligamentous structure, such as the neighbourhood of the joints in the fingers or deep fascia of neck. (2.) When it is caused by some unhealthy matter, as follows from the bite of some animals, or when diffusing rapidly, as in some carbuncular states. (3.) When it is in very loose cellular tissue, as in the armpit. (4.) In suppuration in highly sensitive organs, as in the eye or under a finger or toe-nail; and (5) whenever it is desirable to avoid a scar. In the majority the aid of the surgeon is required for the general treatment, as well as to open the abscess. In chronic abscess it is best, if the quantity of matter is large to have it removed by means of the aspirator, by which the matter is evacuated without the admission of air, and the danger of subsequent blood-poisoning is materially diminished. The indications for treatment in chronic abscess are to amend the general health, to promote the absorption of the matter; but if it has to be let out, to take care that the sac or containing cavity is speedily obliterated.

Small abscesses are frequently unnoticed, but they are very often the source of blood-poisoning, and give rise in the end to very serious illnesses, and even fatal consequences, by the septicœmic or general blood-disorders which follow from the changes which are induced in the blood by septic germs finding admission into the system. Small scratches upon the body, slight punctures, or forgotten injuries are often the means by which mischief results a few weeks or months afterwards. It is right, therefore, for the school manager to note these abrasions, and compel the children under his charge to attend to them, to keep them clean, and to prevent as much as possible contact with the outer air until the abraded skin has completely healed. Some popular remedies, as the inner skin of an egg-shell, goldbeaters'-skin, lily leaves, and other simple applications are beneficial whenever they effectually keep out the external air from an abraded surface.

Whitlow.—One of the most common sources of mischief is a whitlow; this is an inflammation at the edge or root of a finger or toe-nail. It is often set up by a so-called hang-nail, a small piece of skin which has been detached from the edge of the nail by violence, and which is allowed to be irritated by dirt or continued rubbing; it soon becomes very painful, and, unless treated properly, is liable to end in abscess or other mischief. All the symptoms of an acute abscess arise, and the child is not in a condition to do his school work. It is the usual custom to poultice these swellings, and to promote the formation of matter by increasing the inflammation in the part. This is wrong treatment. The best plan is to keep a little cold water upon the finger—to apply a piece of wet lint around it. Keep it cool by frequently dipping it in a glass of water, and not covering it up with oil silk as is frequently done, but let the water constantly evaporate, so as to keep down the inflammation. In a few hours, or at the most, a day or two, a small white spot will be observed by the side of the nail containing pus, which may be evacuated by means of a needle passed through the white part. The pus will escape into the lint. The cold water should be continually renewed until all tenderness is gone, the part kept studiously clean, and as soon as tenderness has departed let it be kept covered up with a finger-stall, having previously applied a small quantity of Turner's cerate (calamine ointment) upon the edges of the nail to keep it moist, and so allow any discharge to escape. If the pus is deep in the tissues, or pressing on the bone, it must be let out by the lancet, but it will seldom happen that cold water, if applied soon enough, will not be able to prevent the development of this mischief; of course it will be requisite to avoid all games such as cricket, or fives, or marbles, or anything else by which a bruise may result to the finger. It is important to observe that it is only the inflamed part which is to be kept cool. The cold water is not to be applied to the whole of the finger, for if this is done vitality is reduced too much, and mischief may result. The hand is not to be chilled altogether. The same treatment must be used when the toe is the seat of the disease. It generally arises in the great toe-nail, and in those cases has followed in consequence of an injury to the nail in kicking at football or other games, and the wearing a boot or shoe which is too small for the toe. It is curious to note the general neglect which is shown by parents and bootmakers to the natural position of the toe, and the necessity for allowing for its natural growth. There is no room left for this. The growing boy has a new boot made which is just long enough to contain his foot, but there is no allowance for that half inch which will probably be added to the foot in the course of the next four months, and, as a consequence, the toe-nail is pressed into its tender quick, or the toe itself is bent out of its proper position, and the foundation laid for a bunion in future years.

A new boot for a growing boy or girl should always be at least from half an inch to one inch longer than the foot of the wearer.

It is very important to avoid pressure of every kind upon those small abrasions or gatherings which will sometimes arise from injury to the feet; water applications, provided they are frequently changed, will be better than poultices, though these latter are sometimes necessary when there is much tenderness and great heat; but small abrasions are best covered up with chamois leather, spread with soap plaster, and by that means fresh injury prevented.

Styes.—These are small abscesses which form at the edge of the eyelids; they proceed slowly to suppuration, and are often very painful. When the pain is great a cold bread-and-water poultice for twelve or twenty-four hours is the best thing to be done, and after discharge has taken place, to touch the discharging part with a minute portion of yellow basilicon ointment, taking care that none of the ointment gets on the mucous membrane of the eyeball; it would do no real harm if it did, but would cause a little unnecessary smarting. Styes are an indication of a low vitality, and show that the blood is out of order. The eye should not be used by reading or writing when it is inflamed from the close proximity of a sty. If the lashes are matted together with small scaly bits of cuticle, it is advisable to touch their roots every night with a little citrine, or golden ointment, and bathe them well in the morning with cold rain-water, and the scales removed from the eye-lashes.

The digestion should be attended to, some alkaline aperient given, and care used in regard to diet.

Quinsy is another form of abscess, which has its origin in the tonsils; it generally arises from taking cold when the blood is out of order, and a perspiration, which was carrying out of the body some morbid matter, has been checked, and the discharging material thrown back into the circulation. Sometimes a herpetic eruption forms on the lips; in other cases, instead of appearing on the lips, it affects the tonsils. The follicles or glands in these organs take on an inflammatory action, and ultimately suppurate It is very important for the schoolmaster to be able to recognise a quinsy at once, and not to mistake it for some more mischievous form of disease, such as scarlatina or diphtheria, and then to frighten himself out of his life. The one is not infectious, the others are. Quinsy is a corruption of the term cynanche, which means inflammation of the throat, and in olden times included croup, diphtheria, pharyngitis, tonsilitis, and some forms of scarlatina; it is now restricted to inflammation of the tonsils. The gland swells, there is painful deglutition, the child cannot swallow comfortably, and, on inspection, one tonsil is seen to be larger than the other; the enlargement has been generally preceded by a chill, perhaps a rigor or shivering, and the child is out of sorts; but there is not at first the direct fever which attends an eruptive disease. If the thermometer is used it does not give that high temperature which indicates scarlatina, seldom exceeding 100°, and it is very different, on inspection, from diphtheria. In this latter disease the throat is altogether red and glassy-looking, or there is a distinct leathery-looking membrane forming upon one or both tonsils, perhaps extending to the velum on the uvula, whilst, in quinsy, there is no appearance of membrane. The tonsil looks at first rather paler. It does not show very decided redness until the enlargement is manifest, and the difficulty of swallowing considerable. In diphtheria the swallowing is not at first much interfered with. Acute pain on swallowing is much more likely to be quinsy than anything else. Sometimes we see an aphthous state of throat, consequent upon some blisters on the tonsils, which seem to be the analogue of herpes on the lips. The blisters form on the surface of the organ, instead of leading to suppuration inside. These conditions are closely connected with digestive disturbance. There is generally a foul tongue, severe headache, loss of appetite, and confined bowels. A good dose of calomel and James' powder, in the proportion of two grains of each, is the best treatment, with a saline purgation on the following morning. If quinsy is forming, it is best to use a warm fomentation to the throat, to inhale steam frequently, and to encourage the discharge of matter as quickly as possible; but as soon as discharge has taken place, to gargle with cold water. Caustics and actively astringent applications are generally injurious, though frequently practised. They tend to weaken the throat, and render the patient liable to similar attacks.

(To be continued.)

—o—

'How I Teach Elementary Science.'

BY RICHARD BALCHIN,

Head Master of the Gloucester Road Board School, London.

FOURTH-SCHEDULE SUBJECTS: MECHANICS.

'LIQUIDS under pressure.' We come now to a part of the subject that seems to furnish a wide field for the display, on the part of both text-book and teacher, of an astonishing amount of mistiness. It is very seldom I hear a teacher giving a lesson upon 'Liquids under pressure' or upon 'Liquids under gravity' before I soon become painfully aware of the fact that the teacher is not quite sure what it is he is talking about. 'The Representation of Chaos' at the opening of Haydn's oratorio is not out of place. But to attempt anything of the kind in a lesson on 'Mechanics' betrays a dim perception of the necessities of time and place. The confusion seems to arise, 1st, from the want of a clear understanding as to what 'gravity of liquids' really means; 2nd, from failing to distinguish between the pressure of a liquid due to gravity and the pressure due to the transmission of a force mechanically exerted upon some part of its surface; and 3rd, from the possession of the singular notion, or comical idea, that the pressure of the atmosphere of 15 lbs. upon every square inch, is exerted upon the exposed surface only of a liquid, and is in some way or other transmitted throughout the liquid and then exerted upon the bottom and sides of the containing vessel. I once heard a teacher giving a lesson upon 'the gravity of liquids and the hydrostatic press.' Now the hydrostatic press has nothing to do with the gravity of liquids. By the gravity of a liquid, as indeed of every other mass, we mean its tendency to fall to the earth's centre; and when anything intervenes to intercept the body, then pressure is produced. The intensity of the tendency,

and so the amount of the pressure, depends upon the mass of the body. Weight is a measure of mass; so weight is a measure of the pressure due to gravity. If I fill a cylinder with water, there is a certain pressure upon the sides and bottom of the cylinder, due to the gravity of the liquid. If now I press down a water-tight piston upon the surface of the water, the pressure I thus mechanically exert is transmitted, and acts upon every part of the inner surface of the containing vessel. This latter pressure is the kind of force utilized in the case of the hydrostatic press, and is quite distinct from pressure due to gravity. All this can, by the aid of a few experiments, be easily grasped by children. A sharp boy is sure to ask what is the difference between the pressure of a liquid and that of a solid. To show the difference, cut a small cube of chalk, to exactly fit into a small box, of which the sides can be easily removed. Say the chalk weighs 4 lbs. The boys will soon see that the whole of this 4 lbs. presses against the bottom of the box—none against the sides, or they would be pushed away, being easily removable. This is simply because it *is* a solid, *i.e.*, its molecules are firmly held together by the attraction of cohesion; and so the mass retains its shape, even after you remove the sides of the box. Now fill a similar box with water, in one of the sides of which a hole has been bored and a cork inserted. Ask now whether the pressure is exerted at the bottom only of the box, as it was in the case of the solid; the boys will answer 'No.' Show by removing the cork that there *is* a pressure upon the sides, causing the water to rush out. If several holes, at various heights in the side are bored, the boys will observe how the pressure increases with the depth of the water. Incidentally remark, as to the construction of reservoirs, that the sides are made thicker at the bottom than at the top. All this has to do with 'the gravity of liquids.' Now take the cube of chalk, place it in the box, exert a pressure upon the upper surface of the block, and get the boys to see that the whole of that pressure is transmitted and borne by the bottom only of the box—none by the sides. Then by means of diagrams, or if possible by working models, show by filling with liquid a water-tight vessel closed on all sides with the exception of two or three cylinders of equal diameters, in various parts of the sides and top, into which cylinders pistons are fitted, that if a pressure, say of 4 lbs., is exerted upon the piston in any one of the cylinders, every other piston in any part of the containing vessel is forced outwards with a force of 4 lbs. In this way the boys are led up to the conclusion that 'pressure upon a liquid is transmitted undiminished and in all directions throughout the entire mass.'

The next point to make clear is this:—'That if a pressure of, say 4 lbs., is exerted upon any square inch of a liquid, that pressure is transmitted to every square inch of surface in contact with the liquid.' For instance, in the cylinders above alluded to, if one of the pistons were one square inch in area, and one of the others 4 square inches, then if I place a 4-lb. weight upon the smaller piston, the other would be pushed outwards with a force of 16 lbs. A boy will sure to remark here, that the 4-lb. weight sinks farther down than the 16-lb. weight rises. It can easily be elucidated *how much* farther; and so the teacher will soon lead to the fact that this is an instance of the 'dispersion of force, but not of its creation.' Reference will also be made to the analogous conclusion in the case of the mechanical powers, viz., that 'force is gained at the expense of time.'

During my lesson upon this subject, an exceedingly thoughtful boy raised his hand, signifying that he wanted to speak: he unburdened his mind of a difficulty. I was greatly delighted with what he said, especially when I found that other little minds had been similarly exercised. He spoke to this effect: 'If what you say is true, sir, then if I place that box of water in one pan of a pair of scales, and put weights in the other pan to exactly balance; then suppose that cylinder is one square inch, and the bottom of the box 100 square inches; if you place a 4-lb. weight on the piston, there must be 400 lbs. pressing against the bottom of the box, and therefore pressing down the pan of the scales; and yet only another 4 lbs. on the other pan will balance, because after all you have only added 4 lbs. more on to the scale with the box. How is this?' 'I should have thought,' continued the lad, 'that if there is 400 lbs. more pressing on the bottom of the box it would weigh 400 lbs. heavier.' I took up the boy's difficulty, and soon got it removed by the other boys, until we arrived at the conclusion that this supposed puzzle arose from leaving out of consideration the pressure *upwards* against the top of the box, which counteracted or took off the pressure on the bottom. Altogether, this subject formed most excellent material for thought training. Every now and again points were presenting themselves which would set the whole class thinking most profoundly; and it was in the highest degree pleasing for me to note how the general current of intelligence in the whole class flowed on like a river towards the ocean, gathering at each turn fresh thoughts and new truths, widening and deepening until it reached the broad generalization or universal law.

(To be continued.)

Eminent Practical Teachers.

DAVID STOW,

Founder of the Training System of Education.

BY JOHN R. LANGLER, B.A., F.R.G.S.,

Of the Westminster Training College, Ex-President of the National Union of Elementary Teachers.

II.

THE prejudice against 'the newfangledsomed notions' of teaching expressed by Granny in the extract last quoted was very common, but the 'weans' were themselves so delighted—as they always are in a *true* infant school—that they 'wadna come out.' A Shakspere would not have seen

> 'The whining schoolboy, with his satchel
> And shining morning face, creeping like snail
> *Unwillingly* to school'

in the Drygate. 'Wee Geordie' and his companions 'got sic grand fun, mairchin' and swingin', and I canna tell ye what a', that' their parents 'were just obleeged to let them gang their ain way.' The 'baubees' required at the school were found to

be economically expended, and soon the mothers confessed that they, at least, had 'na muckle objection to the chainge.' Granny had heard of instruction about 'horizontails and perpetriculars' and other matters which she confessed 'are clean ayont my comprehension.' During the visit referred to, the old lady, looking round inquiringly, said:

Granny. My sight's no that gude, Maister, but just since I put on my spentacles, what kind o' pictures are these on the wall next us—a monkey, and syne a teeger, and then another broad wi' L's and C's, and black scores scartit hither and thither, like lines in a wean's first copy (geometrical figures). How can ye reconceel monkeys, and sic like trash, wi' religion, and teaching weans richt ways, as they tell me ye do? And gin ye stock their heads full o' sic nonsense, what room will there be for the—'great and important truths?'—Man, I'll be plain wi' ye—I am very angry; but I ken that's no richt, for patience is a virtue, they say—is it no?

Master. Now, Mistress, I must say one word. Whether, think you, is it preferable to keep the children, as you say you were kept, three hours at a time fixed to your seat, and perhaps only twelve or fifteen minutes of which you were employed repeating the mere sound of the words of your lesson, labouring away at a dry subject like the A B C, or, as these children are, employed every minute at something that is improving to body or mind—learning the proper use of everything, and even what monkeys and tigers are in their nature and dispositions. Allow me to say, Mistress, our object has been to give to the Infant Training System a thorough Scriptural basis, and this is not a difficult task if we but consider the wideness and extreme variety of the range, embracing as it does the foundation and elements of much that is most interesting in nature and in art.* It is true we amuse the little ones, for what child will learn much, or attend to any instruction, without amusement? frequent exercise and activity, you know, add to the children's health; and I believe you will grant that the promotion of cheerfulness and health is perfectly consistent with the Scripture precept, 'Train up a child in the way he should go.'

Granny. Ay, ay, perfectly consistent, to be sure—bears, and lions, and girnin' wolves, and a' these kind of cruel beasts; there's a heap o' Scripture in them, Is'e warran'.

Master. Well, Mistress, can you say these animals are not spoken of in the Bible? And are the names and dispositions of both wild and tame animals not often used there to illustrate moral and religious subjects?

Granny. Weel, I'll no say; but I think, Maister, the less ye teach the weans about sic beasts the better, at least in a schul'. I aye thought they were kept in dens in a show-box. Let everything gang to its richt place, Maister; wha e'er heard o' a schule for teaching about wild beasts?

Master. I entirely differ from you, Mistress; for as animals of various kinds, not only lions, bears, and wolves, which you particularly mention, but other beasts, birds, reptiles, insects, and even fishes, are frequently noticed in Sacred Scripture in reference to their peculiar qualities, why then should not these children be made acquainted with their nature, dispositions, and use? For example, 'Be wise as serpents, and harmless as doves.' Unless children first know the peculiar character of the serpent, and also of the dove, this passage to them is of no practical use. The same may be said of a thousand other passages of Scripture. The Bible refers not only to wild and domestic animals, but to very many things in nature and the arts, in the common and ordinary affairs of life—all of which we teach the children. But, independently of these considerations, if you don't employ the children's time in learning good, they will employ it themselves in learning evil. Why, then, not occupy a portion of it in exploring the power, wisdom, and goodness of God in the animal creation, as revealed in the Bible? Never forget this, Mistress, that, except when asleep, the mind of a child, as well as his body, is never idle—all is activity. We would not teach secular science from the Bible, any more than we would teach reading from that sacred book, but we would teach as much as would enable the children to understand the meaning of the passage read and intended to be illustrated by the particular emblem, such as of an animal for example. Children are so fond of Scripture training lessons, that when liberty is granted by the Master, they eagerly call out for a Bible lesson.

Granny. Weel-a-weel; but are ye no keeping ower muckle amang the beasts, Maister? I'm sure it's no beasts the Bible was written for.

The question of religious exercises in schools was keenly discussed outside the Educational Society. Mr. Stow indicated his principles in the following dialogue:

Granny. Ay, but, Maister, ye maun excuse me ance mair, for atwell-a-wat I'm but a poor doitit bodie, and maybe no sae weel learnt as my son, or the like o' you—but the prayer, man—I was amaist gaun to be as graceless as yersel'—ye hae forgot *it*, hae ye na? Can ony blessing be expected to come out-owre this, or onything else, if we dinna leuk up and ask a blessing?

Master. Now, Madam, I find you are really very sharp with me, but I excuse your anxiety, and must respect those sturdy principles by which you, unlike some of your younger matrons, appear to be actuated, and therefore I shall also explain this matter as you desire.

Granny. Thank you, Sir—ye're very discreet, *considering*.

Master. You must know, Madam, that I always open as well as close the school by prayer and singing a hymn. We also teach the children to repeat the Lord's Prayer;* and, of course, *previously exercise them on its meaning*. It must, we conceive, be important that these children, in the dawn of their reason, use that comprehensive prayer which the disciples of Christ, in their little more than infant knowledge of its great meaning and comprehensiveness, were commanded to use. I say this, Mistress, lest ye be one of those who say that children ought not to be taught to pray.

Granny. Na, na, ye mustna think that o' me, Maister. No learn weans to pray! I wonder wha would say that? Is na prayer ane o' the ways the sinner gangs to God? and, gin we dinna teach them to pray, how can we train them up 'in the way they should go?' Na, na, dinna think that o' me, Sir.

Master. You'll excuse my being particular; *for although my attention is not, and would not do to be, taken off so much as at present by every one who pays us a visit*, yet you seem so smart that I am obliged to be very much on my guard what I say before you, without explaining it. The prayer, goodwife, was at half-past nine o'clock precisely; after which, and previous to going out to the playground, the children had half-an-hour's Bible training in the gallery.

Another lively dialogue justified the introduction of 'secular' instruction, for there were some who thought that in schools for the poor the Bible should be the sole text-book. That prejudice is, after half a century, dead and almost forgotten. But we must quote no more.

About the year 1828, the Glasgow Educational Society, at Mr. Stow's suggestion, invited Mr. Samuel Wilderspin, of London, to deliver a series of lectures on the methods of Infant Schools. The experience of so successful an infant teacher was, at that time, most valuable, and Mr. Wilderspin's visit to Glasgow and Edinburgh increased the interest in popular education which had been already excited, and served to attract special attention to the merit of separate schools for infants.

Mr. Stow's chief aims, however, were different from those mainly contemplated by the system then advocated. He sought to secure, not only high intellectual results, but also a change of moral character. In his school, children on the lowest social level were, during school hours, separated from the tumult of iniquity which prevailed in their bye-streets and lanes, and were taught new forms of mutual intercourse. The change wrought in the physical appearance and intellectual aptitudes of these children gratified many observers; but Mr. Stow, looking to the inner life, or moral history, sought *there* evidences of improvement. Their changed character could not be *exhibited*; no

* The emblems of Scripture, in particular, are conducted two mornings per week, as distinct oral training lessons to the whole pupils in the gallery, and from each of which valuable practical lessons are drawn. During the process of picturing out these (in words), innumerable allusions to *ordinary life and common things* are, of course, brought under review, and analysed in the most simple terms—in the first instance as it were—*broken down into crumbs*, and in the juvenile and senior departments in *rather* more complex terms. *We all know that the spiritual teaching of the Bible is communicated through natural objects and things*; and practical Christian duty by examples as well as precepts. The picturing-out principle of Bible training, therefore, is invaluable to the young.

* This is repeated simultaneously in one voice, very slowly, distinctly articulating every syllable, and making a sensible pause between each word—not rapidly rattling it over as is frequently done.

examination could bring out moral results, and thus the higher aims of the experiment in the Drygate School were, as yet, unappreciated. The most distinctive part of his system in relation to other infant schools was, at that time, the hold which, by Bible truth, he sought to take of the early moral life, that it might be moulded anew. In dependence on the Divine blessing, he made the daily Bible lesson, explained and enforced on principles which he had laid hold of in his Sabbath-school, the basis of his system of moral training. All conduct in the 'uncovered school' was habitually referred to the instructed consciences of the collected children, and the distinction between right and wrong being perceived, there was established in the 'little world' a common sentiment, which the 'sympathy of numbers' firmly maintained. Infants from the Drygate learnt to be truthful, honest, and forbearing; flowers bloomed in the small garden-strip which edged the play ground, and pendent currants ripened within the reach of children who had, in this training school, early acquired the power of self-denial.

A reaction of public feeling which followed certain extravagant exhibitions of the mental capabilities of children so far removed sympathy with the work as to render the raising of £150 for the Drygate school impossible. Mr. Stow, having faith in his principles and in himself, not only accepted this burden, but obtained a large hall in the Saltmarket, with space for *playgrounds*, always insisted upon as essential to his methods of moral training. Here, again, he laboured almost unaided, but with a confidence of success which was enduring. In 1834 nearly a hundred teachers had been 'trained,' and in order to carry out his system with older children, he purchased a playground for the St. John's Parish School, which, as 'the juvenile school,' was soon filled with children over six years of age, and afforded to the increasing number of students further opportunity of practice in the methods of instruction. Queen's scholarships were then unknown, and each candidate who came for a few weeks' training was soon quickened into enthusiasm, and gave himself or herself wholly to the study of the *greatest effectiveness in the methods of instruction and moral training*. The Rev. J. Auld was Mr. Stow's chief coadjutor at the St. John's School.

The impulse derived from infant exhibitions was, as we have seen, very short-lived; but in these new schools Mr. Stow presented to the minds of educationists something which could be estimated, and which was capable of being embodied elsewhere. Men of highest influence were brought to acknowledge the power of the principles here exhibited in practice, and freely offered the sympathy and co-operation which had been so long withheld. The Glasgow Educational Society, for some time inactive, was reconstituted, lectures were delivered to crowded audiences, and 'the common school was advanced.' Chief among the objects now proposed was one 'to maintain a Normal Seminary in connection with our parochial institutions for the training of teachers in the most approved modes of intellectual and moral training, so that schoolmasters may enjoy a complete and professional education.' In March, 1835, the Society adopted as their own the Model Schools hitherto maintained by Mr. Stow, who, in this fact and triumph, had his highest reward. The first formally instituted Normal School in Great Britain—one which issued diplomas of skill in method to students who had satisfied prescribed conditions—was that originated by Mr. Stow. St. John's, Battersea (the first founded in England), was established by Sir James Kay Shuttleworth and E. C. Tufnell, Esqs., in 1840. The Regulations of the Normal Seminary, drawn up in 1828, provided: (1) That *every* student be trained in the Model Infant School, that he may be thoroughly initiated into the system of Moral Training. (2) That each candidate engage to remain at least three months, in order to secure a diploma; (3) That he (or she) possess a certain amount of elementary education; (4) That each applicant for admission produce a satisfactory certificate of moral character; and (5) That each student be subject to the Regulations of the Model Schools and to the direction of the Model Superintendent.

Teachers who wished to improve themselves were allowed to visit the Model Schools for shorter periods, but not less than six weeks. Among those who sought the diploma were many who had previously passed through the University.

The two Model Schools—'infant' and 'juvenile'—were a mile apart, and this inconvenience was so increased by the crowded state of the class-rooms that a new building became indispensable. Repeated appeals to the Lords of the Treasury having long remained unanswered, the Glasgow Society raised £2,260, and 'began to build.'

On November 14, 1836, a procession of five hundred of the leading citizens of Glasgow wended its way through the city to witness the laying of the foundation-stone of the Normal Seminary. It was headed by members of the University, the chief magistrates, and distinguished ministers, who, by their presence at this ceremony, showed their interest in the intellectual, social, and religious welfare of the people. 'Bible-training in schools' and the 'practical training of schoolmasters' had been distinctly avowed by the Glasgow Society as two elemental principles necessary to the progress of true education; and on this 'historic day' these principles received public acceptance. Normal schools, however, were 'new,' and did not 'command' the needed funds. Still, Mr. Stow persisted, and in the summer of 1837 four Model Schools—initiatory, junior, senior, and industrial (for girls)—were opened, each fully furnished and 'assigned to first-class workers.'

Mr. John M'Crie, a distinguished scholar, was chosen as the first rector of the new Normal Seminary, and began his labours in Glasgow in November, 1837. He had been deputed to visit the chief educational institutions on the Continent, but testified, on his return, that nowhere had he seen any which, in efficiency and completeness, were so far in advance as those based on the principles and methods of Mr. Stow's system.

Sir James Kay Shuttleworth (then Dr. Kay) and E. C. Tufnell, Esq., who, in the discharge of their official duties, had been impressed by the influence which the '*trainers*'—masters and mistresses—had over the young, visited Glasgow at this time in order to see the working of the system under Mr. Stow's personal supervision. They were both much gratified, and many additional trainers were introduced into the schools connected with the Poor-law Unions in England, then largely under the control of these enlightened Christian gentlemen. Dr. Kay in his

evidence before a Select Committee of the House of Commons, in 1838, described the Glasgow Normal Seminary as 'the most perfect school with which he was acquainted,' as affording opportunity both for the acquisition of theory, and for the practice of the methods of instruction. He added, that whilst in Scotland persons might be easily found who were sufficiently educated to enter at once as students of the system, it would be difficult to find a similar class of candidates in England, and urged that measures should be adopted for preparing young men and women by preliminary courses of elementary instruction, to enter upon a subsequent study of 'methods' for at least 'eighteen months.' He also stated that the students then at Glasgow were persons of 'strong religious convictions,' and were 'under the influence of religious sentiments.' He believed that the difficulties of establishing a Normal School in England were not insurmountable, and with reference to the question of moral training, said: 'From the experience I have had, I am inclined to think, that if systematic arrangements were adopted for superintending the conduct of the children in the playground, and for the whole course of moral training pursued in the school, that the difficulties of making that part of the training of a young child efficient in a large school are greatly exaggerated by those who have not had an opportunity of witnessing the success obtained in such schools.'

He applied these remarks also to the higher class of schools, adding that 'although it may require a larger amount of intelligence, and superior vigilance and activity on the part of the master, yet his opportunities, not merely of inculcating moral lessons, but of forming good habits, are increased by the accidents which occur when numbers are assembled, and which develop the peculiarities of character, and especially the moral tendencies of different characters, rather than in a small school.'

This evidence was taken fully eight years before the appointment of the first pupil-teacher, and foreshadowed the 'Minutes' of 1846, which, pervaded by the spirit of Dr. Kay during fourteen years, gave a vast impulse to popular education in Great Britain, and added to the name of Sir James Kay Shuttleworth a lustre which will not grow dim for many generations.

By Mr. M'Crie's early and lamented death, the whole weight of the institution again rested on Mr. Stow, whose incessant labours nearly exhausted his physical strength. In the midst of these toils, the Committee of Privy Council offered him the first inspectorship in Scotland. Many have regretted that he declined the offer, as a position of such influence would have enabled him to show, over a large area, the effects of his system of Bible-training. He did not 'like to be paid for services in any shape,' and, besides, the failure of his health prevented his undertaking the arduous work of an inspector. He humorously paraphrased the caution of his medical adviser, saying: 'If I do not pull in, I must be stretched out.' Still, he was constantly in attendance at the Seminary until November, 1839, when the rectorship was accepted by the Rev. Robert Cunningham. This gentleman had practical acquaintance with the best schools on the Continent, and also in the United States, where he had been a professor. Much needed relief was, however, secured by this appointment. From all quarters there came demands for 'trainers,' which could not be met. In 1840, the Wesleyan body planned a scheme of education, and adopted the 'Moral Training System' for their day-schools. All their 'students' were sent to the Glasgow Normal Seminary for about six months' training, until they opened their own Institution at Westminster in 1851. During that interval of ten years about four hundred and forty teachers were trained by Mr. Stow for Wesleyan schools in England.

The class-rooms were crowded with students, whose minds and hearts offered ready sympathy with the objects of the Training system, and who, in the presence of its visible effects, were soon subject to the prevailing enthusiasm. Mr. Stow's stated visits to conduct the private and the public criticism lessons were prized opportunities of culture. His exposition of principles, illustrated on those occasions by practical examples, furnished what was most necessary to a teacher's professional success. His earnest zeal was contagious, and every man and woman who completed the course at the Normal Seminary, short as it was, quitted Glasgow, nevertheless, in conscious possession of a power to 'do good' in the methods there acquired. The elasticity of the student's mind was not injured during training by any anxiety about prospective examinations, for examinations for certificates were then unknown. Each student at that period paid his own expenses. All his time and energy were devoted to the study of the 'normal' theories, and to their practical illustration in the model schools.

In 1840 the Rev. Robert Cunningham resigned the Rectorship. The debt on the new building exceeded £10,000, and as the educational enthusiasm of the time proved to be effervescent, and appeals for aid were fruitless, the double burden of extra work and anxiety weighed heavily on Mr. Stow, and for a time rendered extension and improvement impossible. After a long correspondence, the Privy Council agreed, on December 31st, 1841, to make a grant-in-aid to the extent of £5,000, but on condition that the Normal Seminary should be handed over to the management of the Church of Scotland. In the stress of their financial difficulties, the Educational Society reluctantly yielded. Before the remaining portion of the debt could be discharged, however, there occurred, in May, 1843, a disruption of the Established Church of Scotland, by the secession of five hundred of her ministers; and this event, the particular history of which would here be foreign to our purpose, led ultimately to the necessary abandonment of the building. Mr. Stow and the staff of teachers generally had become adherents of the Free Church, and when, therefore, it was officially notified, that in future the members of the staff must be in communion with the Established Church, there was no possibility of their remaining in the Seminary. Mr. Stow for two years earnestly strove to avert this catastrophe, but in vain. It grieved him to the last to have to establish a second institution in Glasgow. In the hope of the success of his exertions, no site had been secured for a new Normal Seminary; and when, finally, it was necessary to remove, a site was hastily obtained in the neighbourhood, and there 'long canvas-covered tents, with a sawdust floor, and with rough benches, constituted for a time an admirable collegiate structure.'

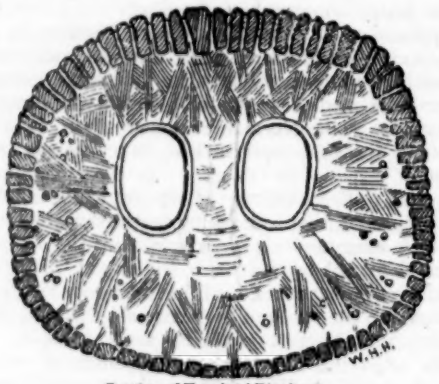
(To be continued.)

Anecdotal Natural History.

BY REV. J. G. WOOD, M.A., F.L.S.,
Author of 'Homes without Hands,' 'Nature's Teachings,' etc.;
AND THEODORE WOOD,
Joint Author of 'The Field-Naturalist's Handbook.'

No. XIII.—ELEPHANTIANA.

"THE fear of you and the dread of you shall be upon every beast of the earth, and upon every fowl of the air, upon all that moveth upon the earth, and upon all the fishes of the sea; into your hands they are delivered" (Gen. ix. 2).



Section of Trunk of Elephant.

These bold and uncompromising words, written at least four thousand years ago, are absolutely true now, as they were then.

Wild animals, no matter what they may be, instinctively flee from man. The domesticated horse, which has never seen a beast of prey, trembles with terror at the smell of a distant menagerie; but the lion which inspired that terror is, in its wild state, quite as much afraid of the odour of man.

Let a lion but detect the dreaded emanation of man, and he slinks off as quickly as he can.

For, though we are happily unconscious of it, a very powerful odour emanates from all human beings, and strikes terror into wild animals. Deer-stalkers know well that they must approach a stag against the wind, for that even at the distance of a mile the stag can detect the presence of man, should the wind blow from him and not to him.

Similarly, the practical rat-catchers will never touch a trap with bare hands. They wear gloves rubbed with aniseed, and imbue the soles of their boots with the same perfume, before they can venture to handle a trap or to walk near the spot where the trap is set. Inexperienced persons neglect these precautions, and in consequence, the rat detects the dreaded odour of man, and keeps aloof from it.

Mole-catchers, again, always keep the skin of a dead mole by them, and rub it between their hands, before they set their trap, so as to overpower the natural odour of the hand.

Of course, there are some animals, such as lions, tigers, and the like, which will attack and devour human beings. But these are exceptional individuals, being almost invariably the aged animals, which have become too infirm to catch prey in the ordinary fashion, and are reduced to lurking about villages and pouncing upon any unwary straggler.

It is well known that the skin of a "man-eater," whether lion or tiger, is never worth preservation, being mangy, bald in patches, and altogether unsightly. Its skull is equally useless as a specimen, the teeth being blunt, worn down and decayed.

There is no animal, however gigantic, however fierce, however powerful, of which man is not the master. In proportion to his bulk, man is perhaps the weakest of living beings, and yet he is master of the strongest.

Not only can he destroy them—that is comparatively a simple task—but he can take them from their own savage life, and force them to become his servants.

So he has taken possession of the horse, the camel, and the ox, and made them bend their backs to the burden and submit their necks to the yoke.

He has reclaimed the dog from a predaceous life, and taught some of them to guard the flocks which in the wild state they would have devoured, and to be the friends and companions of their masters. Others he has taught to chase prey, not for themselves but for him.

He has taught the falcon to chase birds for him in the air, and the otter and cormorant to catch fish for him in the water. They not only do his work, but are proud of doing it, and contemptuously reject the society of their relatives who live only for themselves.

No better example of the universal mastery of man can be found than in the tame elephant. What is a man, that he should make the mighty elephant obey his orders? The creature could crush him in a moment, and in a fit of blind fury will do so. But when it is in its senses, the elephant acknowledges man as its master, and becomes his obedient servant.

Man rules by two means, Fear and Love. There are some beings which, from no fault of their own, are so constituted that they must be made subject to fear before they can learn to acknowledge Love; and this is the case, not only with different animals, but with different individuals belonging to the same species.

Take, for example, the dog. There are some dogs, just as there are some men, which are constitutionally ill-tempered, violent, ungrateful for kindness, mistaking forbearance for weakness, and ready to bite the hand that feeds them. It is impossible to rule them by love, until they have learned to fear, and can understand that the hand which gives food can withhold it at will, can render them powerless at will, and can at will inflict pain without the possibility of their evading or avenging it.

Having, then, been taught by fear to acknowledge that man is their master, they can begin to learn to be grateful for their food, and to lick the hand which gives, in lieu of biting it. For such dogs a severe chastisement is really the kindest of lessons, and although "force is no remedy," it is often a needful preliminary before applying the remedy.

But there are dogs, as there are men, of a higher order, which are absolutely amenable to Love, but would be only made obstinate and resentful by fear. Such an one was my bull-dog "Apollo." Possessing all the concentrated strength and courage, added to the instinctive combativeness of his race, which make the thoroughbred bull-dog one of the most wonderful animals in the world, he could be compared to nothing but the Faure "accumulator,"

wherein a million foot pounds of force can be carried in one hand. Despite his powers, which none knew better than himself, he was one of the gentlest and most obedient dogs that I have ever dealt with. I had him when he was but a puppy, and never once beat or scolded him. Yet, he would obey the lifting of my finger, or the glance of my eye, and the very idea of incurring my displeasure was unendurable torment to him.

All servants of the pen must of necessity be so absorbed in the evolution of ideas and the balance of sentences, that they are unconscious of time, space, hunger, thirst, cold, or other material conditions.

It has happened that while I have been thus absorbed, Apollo has tried to attract my attention, and in failing, has taken it into his loving brain that he must have offended me in some way. On such occasions he grovelled on the floor, he whined, he licked my hand, and lay in abject despair until again noticed.

So it is with elephants. There are not two elephants with precisely the same disposition, and the best keepers are those who try to find out the peculiar disposition of the creatures under their care, and to treat them in accordance with that disposition.

As elephants, like falcons, are seldom bred in captivity, but are captured when wild, it necessarily follows that the first lesson they must learn is to fear man, and to realize the strange fact that he is their master.

It is a remarkable fact that there is no task which tame elephants undertake so willingly as that of capturing their wild relatives. They seem to enjoy it with all their hearts; and both sexes are equally keen at the sport, the females acting as decoys, and the males as the representatives of force.

Supposing that a male has to be captured, two female "koomkies," as these decoys are called, saunter leisurely along, and soon make the acquaintance of the victim. Each has her keeper, or "mahout," on her back, and it is a curious fact that an elephant never seems to notice a man as long as he is on another elephant's back.

The koomkies manage to place themselves on either side of the male, and by degrees sidle him close to a tree. One of the mahouts then slips quietly to the ground, and while his koomkie and her companion are distracting their victim's attention, he passes strong cords round the animal's ankles, and then makes them fast to a tree. The koomkies will often aid him in this part of the work by taking the ropes in their trunks, and passing them to their master's hand as he wants them.

A similar process is then pursued with the forelegs, and then the treacherous koomkies suddenly slip off, leaving their dupe fast bound to the tree.

Sometimes, before the ropes are firmly tied, the elephant becomes suspicious and tries to escape. The koomkies employ all their blandishments to lull his suspicions; but if he should still resist, and be too strong for them, a powerful male is summoned to their help, and all three beat him and hustle him about until he is quite bewildered, and at last is held firmly against the tree where the mahout is ready with his ropes.

In either case, the duped elephant is left alone, his vast strength paralyzed in some mysterious manner, and his struggles for freedom only resulting in pain. Those who have witnessed these struggles say that the contortions into which a bound elephant will fling its body are almost incredible. It rolls over and over, it rises itself on its hind feet, butts at the tree and tries to knock it down, uttering all the time its screams of mingled terror and anger.

After a while comes another feeling. It can neither eat nor drink, and the pangs of hunger and thirst are felt. At first, it seems to resent the unwonted feeling, but by degrees is so exhausted that it lies motionless on its side.

Now comes its future mahout. Bringing green food in his hand, he cautiously approaches the prostrate elephant. Mostly, rage will for the moment overcome hunger and weakness, and the animal will try to attack the man. In that case, the mahout quietly retires, and leaves the elephant for a few more hours.

This process is repeated until the elephant no longer tries to resist. He has learned his first lesson, that man, small as he may be, is, in some inexplicable manner, stronger than himself, and that resistance is useless.

Now he will take the grass from the mahout, and before long he welcomes the man's presence as the only mode by which he can obtain food. Sooner or later the lesson is learnt, and the captive acknowledges himself in subjection. The koomkies are again summoned, his hind feet are freed from the ropes, though the fore feet are kept hobbled, and, guided by the koomkies, he is taken to his future home, his new master seated on his neck.

As the late Mr. Rarey found to be the case with horses, the subdued elephant entirely trusts in the man who has conquered him, and even conceives a strong affection for his captor.

Sometimes the elephants, instead of being taken singly, are partly enticed and partly driven into a large and very strong enclosure, called a "keddah." This is made of massive posts planted deeply in the ground, and set far enough apart to allow a man to pass easily between them. These are supported on the outside by stout buttresses, so as to withstand the charge of the trapped elephants.

Fortunately, a herd of elephants never unites in a charge on a given spot. If they were to do so it would be scarcely possible to build a keddah which could withstand them. As it is, the posts and buttresses need only be strong enough to resist charges of single elephants.

Once inside the keddah, the elephants are never allowed to rest. By means of fireworks, guns, torches, and shoutings, the elephants are driven backwards and forwards until they are fairly wearied out, and huddle together without even thinking of escape. Then come the hunters, with their koomkies and ropes, and bind the limbs of the wearied animals before they can understand what is happening to them.

Whether the elephant be taken singly or in numbers, the first lesson which it must learn is that it fears man as being stronger than itself, and that therefore it must obey him. Next, it learns to trust to man for food, and is not long before it learns to love him.

But, when, as was the case with the grand African elephant "Jumbo," the creature has lived with man from its infancy, the preliminary lessons are not needed, and man can rule the animal by love without any mixture of fear. On more than one occasion, when Jumbo was disposed to be rather wilful, his keeper, Scott, was urged to use his whip. This he

invariably refused to do, saying, that if he were once to do so, his influence over the animal would be gone.

I fully believe that if I had even once used the whip to Apollo, his absolute belief in me as a being whose displeasure was infinitely worse torture than bodily pain, would have been lost. No creature can defy the extreme of bodily pain more heroically than a thoroughbred bull-dog. Diabolically cruel experiments have been tried on the animal, and a bull-dog has endured the severest tortures without flinching. Pain he would not have feared, but he did fear the loss of my love for him.

Not but that force may not be sometimes necessary with any elephant. However gentle an elephant may be, it is liable to occasional aberrations of temper, which affect it much as a half-grown cat is often affected with fits. The animal loses all control over itself, and for a time is subject to raging madness.

Now, even a cat can do much harm during a fit, and what a terrible creature a mad elephant must be can be well imagined.

The elephant keepers of India, when they perceive symptoms of coming madness, fasten the animal to a tree just as if it had been newly taken. They put it on very low diet, and if it should be very outrageous, they employ their largest and strongest male elephants to assist in coercing it. These animals understand the necessity of restraining their companion, and if other means fail, will beat him with their trunks when he tries to break his bonds.

Only a short time before these lines were written, a remarkable instance of madness in an elephant occurred in Siam.

In that country an albino, or, as it is generally called, a White Elephant, is held to be, not a mere animal, but a material habitation of Divinity, and is honoured accordingly, even the king paying homage to it. The White Elephant is addressed as "Sublime Grandeur." He has his court and household officers like the king. He is lodged in a palace, and is decorated with jewels of priceless value. The "Order of the White Elephant" is in Siam what the Garter is in England, or the Golden Fleece in Spain.

A short time ago, one of these elephants was unexpectedly seized with madness.

He began by trampling to death five of his attendants, and then broke away from all control. As he was a sacred being, he might not be destroyed nor even injured. By direction of the high priest a fence of consecrated bamboos was hastily set up round him, but he made short work of the bamboos, and the high priest himself had a narrow escape of his life.

"His Sublime Grandeur" then fortunately made his way into a court of his palace, where he could be barred in. Just as a cat does during a fit, the elephant dashed himself furiously against the walls, trying to batter them down with his tusks, and at last inflicted such injuries on himself that he fell dead.

Now it would have been much kinder to His Sublime Grandeur if his attendants could have placed him under control during the period of his madness. It would not have lasted for any length of time, and the animal might now have been enjoying the luxuries of his royal home, and the king and court of Siam would not be wearing the garb of woe.

That semi-worship should be offered to an elephant in Siam, may seem absurd enough to us in England. But really, when we recall the history of the great African elephant "Jumbo," I do not think that we can fairly laugh at the Siamese. The strangest part of the Jumbo-worship is, that it sprang up like a mushroom, in a single day.

There were four elephants in the Zoological Gardens, two from Africa, and two from India, the latter having been brought by the Prince of Wales after his tour in India, in 1875-6. Of the two African specimens, the male, named "Jumbo," was obtained by exchange from Paris, and the female, "Alice," was purchased in 1865.

Of all these creatures, the Indian specimens are the most generally interesting, being playful, and so gentle that they are quite pleased when the keeper's children enter their enclosure. Now, Jumbo, though a good-tempered and docile beast enough, had for some time been so uncertain in his temper, that only his keeper, Scott, dared to enter the cage alone.

Temporary madness does not exclusively belong to the male elephant, as is generally supposed. With him, it is almost sure to take place after he has attained adult age.

The Indian magnates are so well aware of this fact that in order to gratify their love of a peculiar department of sport, akin to the bull-fights of Spain, and the badger-drawing, bear-fighting, and dog and cock-fighting, which until lately disgraced our own country, they keep a number of adult male elephants for the purpose of fighting.

Elephants are mild enough except when in the state of "must," as this peculiar condition is called, and when two "must" elephants are placed in proximity to each other, how they fight is admirably told by Dr. W. Knighton in his "Private Life of an Eastern King."

Mr. Davis, the American agent who came to buy Jumbo, mentioned to me that out of the great number of elephants which had been possessed by the firm for which he is acting, some of the most dangerous were females. Few of my readers may be old enough to recollect "Madame Jack," the elephant which took an important part in several plays at the Adelphi Theatre, many years ago. She, like others, went mad, killed her keeper, and, I believe, several men besides, and then had to be destroyed.

Mr. Davis told me that the first sign of the distemper is that the elephants begin to play with something that takes their fancy, and become so excited that they do not obey their keepers. So that for all elephants, male and female alike, the means of restraint ought always to be at hand. We will now return to Jumbo's life in this country.

To naturalists he was of more importance than either of the others, as he was the first example of an African elephant ever known to be imported into England. To myself in particular he was a singularly interesting creature, and I have watched him at intervals since he was no larger than a Shetland pony.

Indeed, so anxious were his owners and keepers, that Professor W. H. Flower, the President of the Zoological Society, stated that he would have consented to Jumbo's removal even if nothing had been paid for him. More than this, Mr. Bartlett, who has had a life-long experience of elephants, was obliged, many months ago, to apply for means of

instantly destroying the animal if he should break out into madness.

As Dr. Sclater, the Secretary, very forcibly remarks of the great establishment possessed by Messrs. Barnum, Bailey, and Hutchinson: "In so large an establishment, any animal under temporary excitement can be withdrawn from exhibition and placed in seclusion, which there are no adequate means of doing in the Zoological Gardens."

Several correspondents stigmatized this "excuse," as they were pleased to call it, as feeble and irrelevant. To my mind, it is simply convincing. Surely it must be kinder to Jumbo to place him among friends who can restrain him during the short and distinct intervals of excitement, and so enable him to enjoy a long life of petted luxury, than to destroy him in the first heyday of youth.

There is a stock argument very much in use by the advocates of total abstinence, to the effect that man is the only animal that will drink intoxicating liquors.

It is a pity that they should employ such an argument, or rather, illustration, for most animals will indulge in stimulants when they can obtain them. In one of Charles Dickens's letters there is an amusing account of a Newfoundland dog that used to go to a public-house every morning, and have his pint of beer "drawed reglar, as if he was a brickmaker."

Wearied horses can be rendered capable of continuing their journey by the administration of a quart of ale. Cows have more than once been known to drink home-brewed ale that had been set outside the farmhouse to cool, and to play the most ludicrous antics in consequence of the indulgence.

The elephant is no exception to the rule, but is a most determined toper whenever he can find an opportunity.

A well-known writer and lecturer on total abstinence lately cited "Jumbo" as a proof that the largest and strongest quadruped in England was a teetotaler. Had he made himself acquainted with the habits of the animal, he would have found that "Jumbo," like all of his kind, is inordinately fond of any alcoholic liquid, preferring whiskey or any other liquor.

The Indian mahouts, when they have to teach their animals any new accomplishment, always reward them with arrack when they succeed, and the promise of a bottle of arrack will always induce an elephant to exert itself to the utmost.

The mode in which the animal drinks a bottle of beer, wine, or spirits is very curious.

The cork is half drawn, and the bottle handed to the elephant. The animal puts the bottle on the ground against a wall or tree trunk, holds it firmly with one of its fore feet, grasps the cork with the finger-like appendage at the end of the proboscis, and twists it out in a moment.

Then it takes the bottle by the mouth, and gradually tilts it up until all the contents have been transferred to the trunk. Then it gives the empty bottle to the keeper, puts the end of its trunk into its mouth, blows the whiskey down its throat, and holds out its trunk for another supply.

A rather ludicrous example of the fondness of the elephant for spirits was lately exhibited by two of Mr. Barnum's elephants.

They had taken cold, and had a fit of the shivers. A gallon or so of whiskey administered to each of them speedily set them right. Next morning they were quite well, but as soon as their keeper came in sight they began to shiver violently, in hopes of obtaining another dose of whiskey.

Some years ago, an elephant, which belonged to a travelling company, was housed for a night in the stable of a hotel. Next morning the elephant was gone, and no one had heard or seen anything of him. That he should have been stolen was not likely, for the thief could make no use of him, and how so huge a beast could have concealed himself was a mystery. The country was scoured in vain all day; but in the evening, a servant, who had occasion to go to the wine-cellar of the hotel, there found the elephant very quietly reposing among the bottles. The animal had evidently been attracted by the scent of the wine, and with the soft, noiseless tread of its kind, had found its way up the great stairs of the hotel, through the hall, and so into the wine-cellar.

Much of the interest excited by Jumbo is due to his enormous size.

We read in many books of travel that elephants are found from twelve to sixteen feet in height, while some writers have even ventured upon twenty feet.

Now an elephant of that height would be so enormous that the tallest giraffe ever known would need almost an additional yard of height in order to look over the elephant's shoulder.

In India, the elephants used for riding are on an average about eight feet in height, and may be compared to men of five feet six inches. Many are little more than six feet high, while an elephant of nine feet is considered a large one, and a nine or ten feet animal is about equivalent to a man of six feet two inches. Any animal that passes ten feet takes rank among giants. Every inch added to the height causes a proportionate increase of bulk, so that when Jumbo stands by the side of one of the Indian elephants, he looks like a dray horse compared to a Shetland pony.

Figures alone give but a poor idea of bulk.

In order to realize the gigantic dimensions of Jumbo, measure eleven feet in height on the side of a room, and then measure fourteen feet lengthwise; then picture to yourself an elephant of that height and length, and you will form some idea of the proportions of Jumbo. Perhaps even those proportions may be exceeded in time. He is yet but a lad, according to the duration of elephant life, and if he were to attain another six or seven inches in height, and gain another ton in weight, I should not be surprised.

For years Jumbo was an inmate of the Zoological Gardens, growing rapidly, and in course of time helping the keeper to amuse the younger visitors by carrying them on his back. Even their elders did not disdain a ride on so vast an animal, as I can vouch from personal experience. Still, except for his size, Jumbo created no particular interest, and the public cared no more for him than for the other elephants.

Then a report was bruited abroad that an American agent was negotiating for the purchase of Jumbo, and the public naturally thought that the Zoological Society would do itself harm by parting with the largest elephant that had ever been known in Europe.

(*To be continued.*)

—o—

NUTTING SONG.

Music by T. CRAMPTON.

Allegretto. mf
1st TREBLE.
2nd TREBLE.
BASS.
1. When gold-en au-tumn comes a-long, With splendid col-ours glow-ing; When gai-ly rings the
2. The birds are sing-ing in the trees, The squir-rels shy-ly peep-ing; While fall the nuts with
3. Oh! spring is sweet, and sum-mer fair—We sing their charms to-ge-ther; But nought is half so
KEY G. Allegretto. mf
D. t.
reap-er's song; When har-vest fields are mow-ing: Oh, what so gay, to haste a-way, In
ev-'ry breeze, A rhyth-mic pat-ter keep-ing: A-way we stray where sun-beams play, A
bright and rare As gold-en au-tumn wea-ther: We sing her praise in joy-ous lays, And
f. G.
plea-sant au-tumn wea-ther, With hearts so free and full of glee, The ri-pened nuts to ga-ther?
-mid the woodland reach-es; Like birds in spring our voi-ces ring A-mid the oaks and beech-es.
when the nuts are fall-ing—O'er hill and dale, up-on the gale, A-way! our songs are call-ing.
D. t.
CHORUS. ff
Symph.
Hur-rah! hur-rah! The ri-pened nuts to ga-ther!
Hurrah! hurrah!
f. G. CHORUS. ff
Symph.

Recent Inspection Questions.

[*The Editor respectfully solicits contributions—all of which will be regarded as* STRICTLY PRIVATE—*to this column. For obvious reasons, it cannot be stated in which district the questions have been set.*]

Arithmetic.

STANDARD I.

Boys' School.	*Infants' School.*
685	386
79	97
450	
806	Ans. 289
43	
	385
Ans. 2063	291
457	Ans. 94
391	
	801040709
Ans. 66	4
567	Ans. 3204162836
98	
	308
Ans. 469	26
	480
6080907	933
6	706
	4
Ans. 36485442	
	Ans. 2457
Bind, Fire, Coal, Fender, Poker, Tongs, Bright.	Sleeping, Window, Nest, Strong, Wings, Hail, Morning.

STANDARD II. (BOYS).

A.	B.
13804	13804
12686	9081
Ans. 1118	Ans. 4723
29608	29608
269	468
Ans. 7964552	Ans. 13856544
8 | 35769	9 | 35769
Ans. 4471—1	Ans. 3974—3
6090	6090
14800	14800
10010	10010
6008	6080
	687
Ans. 36908	
	Ans. 37667

A. and B.—In a school there are 127 boys and 89 girls. How many boys and girls altogether will there be in 6 such schools? Ans. 1296.

Dictation.—In a few minutes the engine will come puffing along, and the carriages will stop by the side of the platform. When the train arrives no time is lost. Some passengers get out and some get in.

STANDARD III. (BOYS).

(1) I bought a suit of clothes for £3 10s., hat 7s. 6d., boots 15s. 6d., scarf 3s. 6d., and had 4s. 6d. left. How much had I at first? Ans. £5 1s.

(2) Divide one hundred and thirty-three thousand and fifty-six by one hundred and thirty-six.
Ans. 978—48.

(3) I have 13 baskets of oranges, each basket containing 14 oranges. How many are left after I sell 12 dozen? Ans. 38.

(4) Take one thousand and sixty-seven pounds seventeen shillings and fourpence farthing from thirteen thousand one hundred and seventy pounds ten shillings and eightpence.
Ans. £12,102 13s. 3¾d.

(5) Add nine shillings and sixpence, twenty-five pounds ten shillings and sixpence, seven thousand and eight pounds thirteen shillings and three farthings, ninety thousand and nine pounds four shillings and a penny halfpenny, seven hundred and ten pounds sixteen shillings and ninepence farthing, and three thousand and seventy pounds fifteen shillings and elevenpence three farthings.
Ans. £100,825 9s. 11¼d.

STANDARD IV. (BOYS).

(1) Divide nine thousand five hundred and fifteen pounds two shillings and ninepence by three hundred and eighteen. Ans. £29 18s. 5$\frac{9}{4}$d.—300.

(2) How many grains are there in 3 lbs. 10 dwts. of gold? Ans. 17,520.

(3) Find the worth of 1000 square yds. of land at 3s. 3¾d. per yd. Ans. £165 12s. 6d.

(4) A train takes 4 minutes exactly to go through a tunnel 2½ miles long. How many feet is that in a minute? Ans. 3300.

(5) Take nineteen thousand and ninety from one hundred thousand nine hundred, and multiply the remainder by one thousand and ten.
Ans. 82,628,100.

STANDARD V. (BOYS).

(1) Find by practice cost of 2 cwt. 1 qr. 21 lbs. at 1s. 11d. per lb. Ans. £26 3s. 3d.

(2) How far would 1 ton 12 cwt. be carried for £20, if 2 tons 12 cwt. are carried 102 miles for the same money? Ans. 165$\frac{3}{4}$ miles.

(3) A miller has working for him 15 men and 13 boys. Their wages, men and boys, amount to £25 1s. How much does a boy get, if a man gets £1 9s. 6d.? Ans. 4s. 6d.

(4) If a town clock loses 1 minute 45 seconds in 43 weeks 4 days, how much will it lose in a leap year? Ans. 2 minutes 6 seconds.

(5) Bill:—

300 buns at 3 a penny.
1½ lb. seed loaf at 7½d. per lb.
3 cwt. plain bread at 1¼d. per lb.
120 lbs. bread at 2½d. per lb.
7 doz. sponge buns at 3¼d. each.
Ans. £4 12s. 0¼d.

STANDARD VI. (BOYS).

(1) A man saves £50 a year out of his income of £282 10s. How much will he spend in 298 days?
Ans. £189 16s. $5\frac{9}{73}$d.

(2) If 50 quires of paper weigh 1·06125 lbs., how many quires are there in ·05 tons? Ans. 5276·796+

(3) Reduce $\frac{1.8}{2.5}$ and $\frac{3}{7.5}$ to decimals, and subtract the least from the greatest. Ans. ·006.

(4) If it takes 3 million bricks to build a viaduct, each brick weighing $6\frac{3}{4}$ lbs., what will be its total cost at $£6\frac{1}{6}$ per ton? Ans. £55059 10s. $5\frac{5}{9}$d.

(5) Find the difference between $\frac{3}{4}$ of $1\frac{1}{6}$, and the ninth part of a dozen. Ans. $\frac{5}{9}$.

Domestic Economy.

(1) Write all you know about ventilation.

(2) What rules should be observed in purchasing furniture for a small house?

(3) How would you clean—
(1) Articles of brass.
(2) Vessels used for holding milk.

Grammar and Parsing.

Parse

(A) I come from haunts of coot and hern,
I make a sudden sally;

(B) I sparkle out amongst the fern,
I hurry down the valley.

STANDARD VI.

Write an essay on one of the following subjects:—
(1) What do you intend to do when you leave school?
(2) Canada.
(3) The railway.

Geography.

(1) What are the motions of the earth?

(2) Where is the Torrid Zone? In what zone do we live?

(3) What is a cape? Name some capes?

(4) What is a mountain? A hill?

(5) What is land lying between two hills?

STANDARDS IV., V. AND VI.

(1) Chief towns of Ireland and Scotland?

(2) Forths and Bays of Scotland?

(3) What is the chief occupation of the people of Lewis?

(4) In what colony is Adelaide?

(5) What are the natives of New Zealand called?

(6) Name mountains of New Zealand.

(7) Any islands in Pacific belonging to Britain?

(8) To what group of islands does Jamaica belong?

Scholarship Examination, 1882.

QUESTIONS WITH ANSWERS.

AT the beginning of the Examination a notice was issued as in former years to all the candidates respecting copying and clandestine assistance.

The following was placed at the head of each paper:—Before beginning your answers, fill up the following table.

You will do this although you may not answer any part of the paper, which in that case you will return to the Inspector, writing the words 'not attempted' in large letters below.

The name of the Institution at which you are now being examined.	Your Name IN FULL (the *Surname* first), and your Age on your last birthday.	Do you attend this Examination as— 1. A Candidate for admission to a Training College? 2. A Candidate for the office of Assistant Teacher? State the name of the School in which you were a Pupil Teacher. If you have not been a Pupil Teacher, state so.

Dictation and Penmanship.

Twenty minutes allowed for these Exercises.

Candidates are not to *paint* their letters in the *Copy-Setting Exercise*, but to take care that the copy is clean and without erasures.

Omissions and erasures in the *Dictation Exercise* will be counted as mistakes.

The words must not be divided between two lines; there is plenty of room for the passage to be written.

Write in large hand, as a specimen of penmanship, the words, *Major Fitzgerald.*

Write in small hand, as a specimen of penmanship, the sentence—

There is a willow grows aslant a brook
That shows his hoar leaves in the glassy stream.

Dictation.

Write the passage dictated to you by the Examiner, and punctuate it correctly.

[*A.* and *B.* were alternate passages.]

A.

They paddled onward hour after hour, sheltering themselves as best they could under the shadow of the southern bank; while on their right hand the full sun-glare lay upon the enormous wall of figs and laurels which formed the northern forest, broken by the slender shafts of bamboo tufts, and decked with a thousand gaudy parasites; bank upon bank of gorgeous bloom piled upward to the sky, till where its outline cut the blue flowers and leaves, too lofty to be distinguished by the eye, formed a broken rainbow of all hues quivering in the ascending streams of azure mist, until they seemed to melt and mingle with the very heavens.

B.

As the sun rose higher and higher, a great stillness fell upon the forest. The jaguars and the monkeys had hidden themselves in the darkest depths of the wood; the very butterflies ceased their flitting over the tree-tops, and slept with outspread wings upon the glossy leaves, undistinguishable from the flowers around them. Now and then a parrot swung and screamed at them from an overhanging bough; or a thirsty monkey slid lazily to the surface of the stream, dipped up the water in his tiny hand, and started chattering back, as his eyes met those of some foul alligator, peering upward through the clear depths below.

Composition.

Write a letter on *one* of the following subjects:—(1), Gardening; (2), A storm at sea; (3), A day's angling; (4), Some public park.

(1)

Lesbury,
Northumberland,
July 8th, 1882.

MY DEAR PROCTOR,—I have been spending a few weeks here with a relative. Far away from the bustle of the town, it seemed as if I should be utterly cut off from the usual enjoyments of life. Such was the case, but it meant only the substitution of other, though less exciting, pleasures, and among these not the least pleasant were some elementary lessons in gardening. Lesbury is admirably situated for carrying on this work. It stands on the southern slope of a gentle range of hills, which serve to protect it from the piercing winds of the N.E. coast. It is well wooded and watered, the soil is deep and loamy; and this combination of circumstances renders it eminently suitable for gardening purposes. Here are gardens of every size, from a square plot at the front of a labourer's cottage to large market gardens covering many acres.

This is the season when most of the hard work of the year is over. The gardener is now reaping the fruit of his toil in the earlier months of the year. *Then* he had the soil to turn over, the weeds to get rid of, and the plants and bushes to trim and supply with the necessary manure. As each month came, and the frosts disappeared, the seeds had to be sown, and care taken to protect the more tender shoots from the chilly night air. *Now* everything is bright and cheerful. The plots devoted to flowers are gay with roses, violets, geraniums, marigolds, daisies, and other flowers. The vegetables are covering the ground in rich profusion, while the bushes are laden with berries, and the trees give promise of a rich burden of fruit. Strawberries, currants, and gooseberries are being gathered, and as there has been little rain, water is being supplied to the thirsty flowers.

I have never seen such a wealth of fruit, and as for the odours they are as delicious as those of Araby.

The refining influence exerted by constant contact with delicate flowers is everywhere apparent, and this is certainly not the least of the benefits which a plot of ground used for this purpose confers on its possessor.

I shall heartily regret leaving the village, but more that in the crowded city I shall be unable to participate in this enjoyment, which has been at once new and delightful to me.

With kind regards, I am,
Ever yours truly,
JAMES DOUGLAS.

(2)

Bamborough,
July 9th, 1882.

MY DEAR BROTHER,—We have often spoken to each other of the different emotions caused by a view of the sea, but when I last saw you neither of us had experienced the feelings engendered by being in a storm at sea.

Since then, however, I have added to my former experience, and I know now how terrible a foe it can be. We were sailing across the North Sea from Hamburg to Berwick. The day was close and stifling, and gradually great black clouds spread themselves over the sky. Everything about us seemed to presage a storm. Sudden gusts of wind passed across the ship's track, and orders were given to prepare for the approaching gale. The sea, hitherto smooth as glass, was soon covered with a strong lipper, and as the wind strengthened the motion of the ship became more and more uneven, and we had difficulty in moving about comfortably on the deck. Every moment seemed to increase the fury of the blast, and a pitiless storm broke over us.

The wind and the waves together seemed like storm fiends let loose to hurry us to destruction. One instant we seemed as if plunging headlong to the bottom, the waves breaking over the sides of the ship in great sheets, and the next it seemed as if the bow of the ship were about to pierce the clouds. The united strength of two men was required at the helm, and the captain and the man on the look-out peered into the gloom to catch sight of the lights which were to warn them off the rocks on this dangerous coast.

Notwithstanding all the efforts of the helmsmen, we had been driven southward, and the prospects of safely reaching the harbour became more and more gloomy. The roar of the wind among the sails and shrouds was deafening, and the waves, fearful of losing their prey, dashed over us and broke in fragments round about us in their baffled anger.

One of the happiest moments of our lives was when we heard that Longstone was in sight. With great skill the captain kept us from the strong currents running near the Farne Islands, and ere long we reached the harbour in safety. We were indeed grateful to every one who had contributed to the safety of the ship, and thoroughly glad to be once more on shore.

Had great skill not been displayed, you would not now have been receiving this

From your affectionate brother,
THOMAS WAKE.

(3)

Dunkeld, Perthshire,
July 10th, 1882.

DEAR BEN,—'Come and spend a week with me and have a day at the gentle craft,' was the burden of an invitation I had from a fellow-teacher a short time ago. The prospect of a day on the banks of the Tay could not be resisted, and I gladly accepted the invitation. The great beauty of the neighbourhood was in itself sufficient attraction, but when the day for fishing dawned I looked anxiously forth lest wind and weather should spoil our sport.

I remembered the old couplets:—

'When the wind blows from the north
Then the angler goes not forth;
When the wind blows from the east
Then the fishes bite the least.'

From neither quarter were we troubled. There was just a sufficiently strong west wind to ruffle the surface of the stream, and the sky was just as much overcast as to make it pleasant, and prevent strong shadows.

Provided with all needful apparatus we soon reached the river, and for a time were content to follow old Izaak Walton's recommendation, and fished diligently up the stream. By-and-by we grew a little weary of this, and sought out the most likely places, now and again throwing the line where the waters broke over a stone, a sure hiding-place for a trout, or again where the stream swept under the overhanging boughs of a tree, or into an eddying bay.

By this means we succeeded in increasing the weight of our creels; but after luncheon we determined to crown the fortunes of the day by trying for higher game, and adding a lusty salmon to our store. It was not long before success attended my efforts. A sudden tug at my line sufficiently strong to stretch it to its utmost tension, and almost bend the rod double, told me that the bait had taken and the fish had darted away. I followed as best I could, giving the fish as much play as I could. Hope and fear alternated strangely in my breast—hope that I might land my prize, and fear lest my line should give way. Ever and anon I was wading deep in the river, then on the bank, now fast, now slow, the fish playing ten thousand pranks, till, gradually tiring him out, with a dexterous throw I landed him on the bank, a pleasing result of an arduous struggle.

I wish you had been with me to enjoy the sport, hoping that such another day is not far distant.

I am, yours very truly,
W. H. DENTON.

(4)

Gateshead,
July 10th, 1882.

MY DEAR SYRINA,—I do not think I have ever told you of the beautiful park in our town. You who live in London associate the district with nothing but coals and smoke, and chemical fumes, but I can assure you we have some spots of rare beauty here. Our park is one of them.

It is situated on the outskirts of the town, on the side of one the loveliest valleys in the northern counties. Below it runs the river Team, and on the opposite side of the valley stretch the extensive woods of Ravensworth Castle, belonging to the noble earl of that name. Opening up to the north-west is the broad valley of the Tyne, whose waters sparkle like a sea of gold in the rays of the setting sun.

Everything that art can do has been done to enhance the natural beauties of the place. A dene, with sides covered with huge trees, and through which runs a small stream, affords a cool retreat on the hottest of days, while scores of seats are temptingly placed under the spreading boughs of trees, and afford abundant facilities for quietly enjoying the scene.

A large lake in which disport numerous waterfowl, and whose surface is often covered with fleets of tiny craft; an aviary, stocked with rare and beautiful birds; a monkey-house whose inhabitants are a constant source of amusement to children of all ages; a bowling green, and a playground for children, are among the other attractions of the park.

A more beautiful place I do not think you could desire, and I do hope you will spend your holidays with me this year, and you

will then be able to judge for yourself. Several nights in the week we have capital music from our own local bands, and if you will come I know you will alter your erroneous opinions of this neighbourhood.

Do try and come. With best wishes for all my London friends and yourself,

Believe me, ever your loving friend,
A. W. MYERS.

Grammar.

Two hours and a half allowed for this paper.

(No abbreviation of less than three letters to be used in parsing or analysis.)

All candidates must do the composition, parsing, and analysis, and must not answer more than five other questions.

1. Parse fully the words italicised in the following sentences (Syntax is an essential part of parsing):—

'For *who would bear*
The insolence of office and the spurns
That patient merit of the *unworthy* takes,
But that the dread of *something* after death,
The undiscovered country from whose bourn
No traveller returns, *puzzles* the will,
And makes us *rather* bear those ills we have
Than fly to others that we know not of?'

Who—pronoun, interrog., com., 3rd, sing. or plural, nom to 'would bear.'
would—Aux. verb to 'bear,' indicating pot. mood, past.
bear—Verb, irreg. trans., act., inf., pres., gov. by 'would.'
would bear—Verb, irreg. trans., act., pot., past, 3rd, sing. or plural, agreeing with its nom., 'who.'
unworthy—Adj. used as a noun, com., plural, 3rd, obj., gov. by 'of.'
but—Conj. disj., joining the sents. 'Who would bear' and 'It may be,' understood.
that—Conj. cop., joining the sents. 'It may be' and 'The dread puzzles.'
but that—Sometimes parsed as compound conj., joining the sents. 'Who would bear' and 'The dread puzzles.'
something—Com. noun, neuter, sing., 3rd, obj., gov. by 'of.'
puzzles—Verb, reg. trans., act., ind., pres., 3rd, sing., agreeing with its nom. 'dread.'
rather—Adv. of degree, modifying 'puzzles.'
than—Conj. cop., correlative with the adverb rather, and joining the sents. 'It makes us bear' and 'It makes us fly.'
fly—Verb, irreg. intrans., act., inf., pres., gov. by 'makes.'
others—Com. noun, neuter, plural, 3rd, obj., gov. by 'to.'
that—Rel. pronoun, neuter, plural, 3rd, agreeing with antecedent 'others,' obj. gov. by 'of.'

2. Analyse the sentence in Ques. 1, making a table, so as to show in separate columns:—

(1) The nature of the sentence.
(2) (If dependent) its relation to the principal sentence.
(3) Subject.
(4) Its enlargement (if any.)
(5) Predicate.
(6) Its extensions (if any)
(7) Object.
(8) Its enlargements (if any.)

Kind of Sentence.	Relation to Principal Sentence.	Subject.	Enlargement of Subject.	Predicate.	Extension of Predicate.	Object.	Enlargement of Object.
(*a*) Principal Sent., causative, co-ordinate to preceding Sentence.		[For] who		would bear		insolence	the of office
(*b*) Principal Sent.	Co-ord. to *a*, contracted in subject and predicate.	[and] (who)		[would bear]		spurns	the
(*c*) Subordinate Sent.	Adjective to *spurns* in *b*.	merit	patient	takes		that (dir. obj.) of the unworthy (ind. obj.)	
(*d*) Subordinate Sent.	Advl. to *a*.	[But that] dread	the of something after death, the undiscovered country.	puzzles		will	the
(*e*) Subordinate Sent.	Advl. to *a*, and co-ord. with *d*.	[and] (the dread)		makes	rather (manner)	us (dir.) to bear those ills (indir.)	
(*f*) Subordinate Sent.	Adj. to *ills* in *e*.	we		have			
(*g*) Subordinate Sent.	Advl. (manner) to *e*. contracted in pred.	than (the dread)		(makes)		us (dir.) to fly to others (indir.)	
(*h*) Subordinate Sent.	Adj. to *others* in *g*.	we	know	not		of that (indir.)	

3. Select and classify the pronouns, conjunctions, and prepositions in the same sentence.

Pronouns—*Who*, *that*, *whose*, *that*, are relative pronouns.
Us and *we* are personal pronouns.
Conjunctions—*For*, *and*, *and*, copulative or co-ordinate.
But, *that*, disjunctive or sub-ordinate.
Than, correlative.
Prepositions—of, showing a relationship denoting *possession*.
of ,, ,, ,, *place*.
of ,, ,, ,, *possession*.
after ,, ,, ,, *time*.
from ,, ,, ,, *place*.
to ,, ,, ,, *place*.
of ,, ,, ,, *possession*.

4. Explain the terms cardinal, ordinal, and indefinite numerals, and give examples of each.

Cardinal numerals are such adjectives as denote *how many*, as *five*, *nine*, *seventy*, etc.
Ordinal numerals are such adjectives as denote the order in which objects are placed, as first, second, third, tenth, etc.
Indefinite numerals are those adjectives which do not denote an exact number, as some, few, many, several, etc.

5. Give the past tenses of the verbs crow, hew, sing, win, help, bid, chide, write, dig, lie, get, shear, and any obsolete forms of those tenses.

Present.	*Past.*	*Obsolete forms.*
crow	crowed, crew	
hew	hewed	
sing	sang	
win	won	wan
help	helped	holp

Present.	*Past.*	*Obsolete forms.*
bid	bade, bid	
chide	chided or chid	chode
write	wrote	writ
dig	dug, digged	
lie (to rest)	lay	
lie (to speak untruth)	lied	
get	got	gat
shear	sheared	shore

6. Classify the English conjunctions, and show that they are frequently derived from verbs.

Conjunctions are differently classified by different grammarians. One classification is into :—

(*a*) *Copulative*, those which join sentences and also unite their meaning.

and (*b*) *Disjunctive*, those which join sentences, but disconnect their meaning.

Another classification is into :—

(*a*) *Co-ordinative*, those which join together two principal sentences.

and (*b*) *Sub-ordinative*, those which connect sub-ordinate sentences to principal sentences.

The following are conjunctions derived from verbs :—Albeit, howbeit, except, notwithstanding, seeing, save, provided.

7. Explain the force of the following affixes: -dom, as in martyrdom; -some, as in handsome; -less, as in speechless; -ible, as in flexible; and give other examples of each affix.

-dom, in martyrdom, signifies the state or condition implied in the word martyr: kingdom, freedom, wisdom, earldom.

-some, in handsome, originally signified what came readily to the hand, hence, generous, ample, full, liberal, (*e.g.*, He gave a handsome donation). Words ending in -some indicate a good deal of the quality denoted by the noun—troublesome, burdensome, wearisome.

-less, without. Heedless, sinless, witless, senseless, thriftless, houseless.

-ible, in flexible, that which may be (*flecto*, I bend). Irrepressible, indestructible, comprehensible.

8. Define a preposition, and show that prepositions do not always precede the noun they govern.

A preposition is a word placed before a noun or pronoun to show the relation which it bears to some other word in the sentence denoting either a thing, action, or attribute.

In the formation of sentences sometimes the preposition comes after the word it governs, *e.g.* :—

This is the castle which I told you of.
What have you called for?
He whom we saw is not a pleasant man to travel with.
Such work I cannot put up with.
What game have you been playing at?

Here *of* governs *which*, *for* governs *what*, *saw* governs *whom*, *with* governs *work*, and *at* governs *game*.

8. Give examples of noun, adjective, and adverbial clauses employed in subordinate sentences.

Noun clauses: (1) I know *that he will come* (obj. of know).
(2) It is true *that he has arrived* (in apposition with *it*).
(3) *That he was killed* is certain (subj. of *is*).

Adjective clauses: (1) The man *who called* was the gardener (qualifying the subject).
(2) He carried the box *which I had bought* (qualifying the object).
(3) That is the school *where I was taught* (where = in which).

Adverbial clauses: (1) He called *while I was out* (time qual. *called*).
(2) It ended *as it had begun* (manner qual. *ended*).
(3) We love Him *because He first loved us* (cause qual. *love*).

Each of the above clauses forms a part of the principal sentence, but is itself a sentence having a subject and predicate.

9. Name the sources of our language from which the following words are derived :—

Hat, shoe, vest, glove, sock, bonnet, ribbon, tunic, and shirt.
hat—Danish *hat*; in Anglo-Saxon *haet*.
shoe—A.S. *sceo*; in German *shuh*.
vest—Latin *vestis*.
glove—A.S. *glof*.
sock—A.S. *socc*, or Latin *soccus*.
bonnet—Gaelic or Celtic *bonaid*.
ribbon—French *ruban*.
tunic—Latin *tunica*.
shirt—A.S. *scort*, probably from Latin *curtus*, short.

Music.

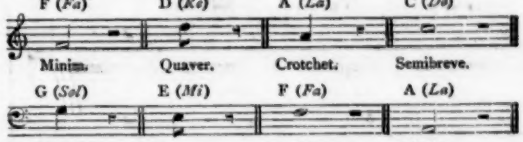
Three hours allowed for this and the School-Management paper.

The Tonic Sol-fa questions are printed in italics.

Candidates must keep *entirely* to one set of questions or the other. *They are not permitted to answer more than* FOUR *questions.*

1. Write *over* each of the following notes its pitch name (A, B, *Do*, *Re*, or other), *under* it its duration name (crotchet, quaver, or other), and *after* it its corresponding rest.

I.

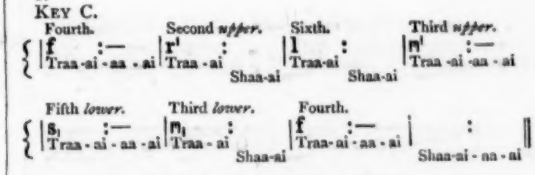


1. *Write* over *each of the following notes its name with regard to its position in the scale (third, fifth, or other), and* under *each the time names for notes and rests.*

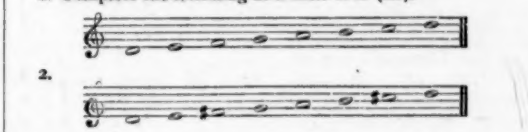
KEY C.

I.

KEY C.



2. Complete the following as a scale of D (*Re*).



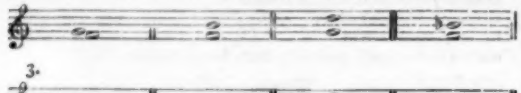
2.

2. Write a scale in the *Lah* Mode, and one in the *Ray* Mode.

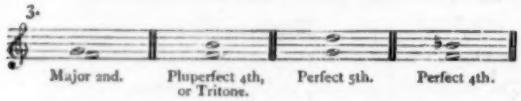
2. Ancient Lah Mode.	l	t	d	r	m	f	s	l
Modern Lah Mode.	l	t	d	r	m	ba	se	l
Ray Mode.	r	m	f	s	l	t	d	r

Ancient Lah.	or, Modern Lah.	Ray.
l	l	r
	se	
s		d
	ba	t
f		
m	m	l
r	r	s
d	d	f
t	t	m
l	l	r

3. Write under each of the following pairs of notes its name (second, third, or other) and quality (major, perfect, or other).



3.



Major 2nd. | Pluperfect 4th, or Tritone. | Perfect 5th. | Perfect 4th.

3. Write under each of the following pairs of notes its name (second, third, or other), and quality (major, perfect, or other).

KEY C.

s :	t :	r' :	ta :
f :	f :	s :	f :

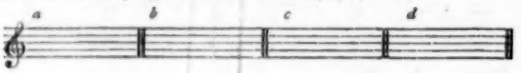
3.

KEY C.

s :	t :	r' :	ta :
f :	f :	s :	f :

Major 2nd. | Pluperfect 4th. | Perfect 5th. | Perfect 4th.

4. Write in *a* the signature of G (*Sol*), in *b* that of D (*Re*), in *c* that of F (*Fa*), and in *d* that of B♭ (*Se*).



4.

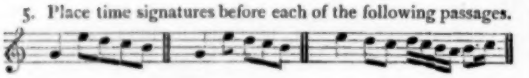
4. Write the names of the respective Dohs when Lah is B, D, and E, and the names of the Lahs in Keys D, F, and B♭.

4.

Lah B	Doh D
,, D	,, F
,, E	,, G

Key D	Lah is B
,, F	,, D
,, B♭	,, G

5. Place time signatures before each of the following passages.



5.

5. Write a phrase in three-pulse measure in primary form, and a phrase in six-pulse measure.

5.

KEY D. Three-pulse measure.

d	:m	:s	m	:d	:r	d	:—	:—

KEY F. Six-pulse measure.

:d	m	:r	:d	m	:r	:d	s	:-	:s	d	:-

6. Write the scale of A (*La*) minor, descending and ascending.

6.

6. Write the upper part of the scale in the minor mode, ascending or descending, in all the ways with which you are acquainted.

6.

Ascending. Old Lah.	Modern.		Descending.
l	l	l	l
	se	se	
s	(s)	(s)	s
	ba		
f		f	f
m	m	m	m

ANSWERS TO
Pupil Teachers' Examination Papers.

AUGUST 26TH, 1882.

CANDIDATES.

Three hours and a half allowed.

Arithmetic.

MALES.

1. Find the cost of 165⅞ cwts. at £2 5s. 6d. per cwt.

	£	s.	d.
Cost of 165⅞ cwts. at £2 each =	331	15	0
,, ,, ,, 5s. ,, = ⅛ cost at £2 =	41	9	4½
,, ,, ,, 6d. ,, = 1/16 ,, 5s. =	4	2	11½
	£377	7	3½ Ans.

2. What is the price of 51,143 articles at £4 17s. 9½d. each?

	£	s.	d.
Price of 51,143 at £4 each =	204572	0	0
,, ,, 16s. = ½ price at £4 =	40914	8	0
,, ,, 1s. 4d. = 1/12 ,, 16s. =	3409	10	8
,, ,, 4d. = ¼ ,, 1s. 4d. =	852	7	8
,, ,, 1d. = ¼ ,, 4d. =	213	1	11
,, ,, ½d. = ½ ,, 1d. =	53	5	5½
	£250014	13	8½ Ans.

3. If 287 is the first term of a proportion, 372 the second, and 5376 the fourth, what is the third? Explain the reason of the rule you employ.

287 : 372 :: ? : 5376

If four terms are in proportion the product of the extremes is equal to the product of the means—that is, taking the above as an example, 287 × 5376 equals 372 multiplied by the third term, ∴ $\frac{287 \times 5376}{372}$ will give the term required, viz., 4147 10/31. Ans.

4. If a man earns £17 6s. in 102½ days, in what time will he earn 50 guineas?

£17 6s. : £52 10s. :: 102½ days : ?
or 346s. or 1050s.

$$\frac{205 \text{ days} \times 1050}{2 \times 346} = 311\tfrac{10}{346} \text{ days. Ans.}$$

FEMALES.

1. Make out the following bill:—

27 yards of black cloth at 23s. 7d. per yard.
34 yards of blue cloth at 19s. 8d. per yard.
23 yards of olive cloth at 16s. 4d. per yard.
29 yards of cassimere, black, at 9s. 11d. per yard.
31½ yards of cassimere, drab, at 7s. 6d. per yard.
40⅝ yards of cassimere, mixed, at 6s. 4d. per yard.

	s.	d.		£	s.	d.
27 yards at	23	7	per yard =	31	16	9
34 ,,	19	8	,, =	33	8	8
23 ,,	16	4	,, =	18	15	8
29 ,,	9	11	,, =	14	7	7
31½ ,,	7	6	,, =	11	16	3
40⅝ ,,	6	4	,, =	12	15	8½
				£123	0	7½ Ans.

2. Find the cost of 748 articles at £109 15s. 0¾d. each.

	£	s.	d.
Value of 748 articles at £1 each =	748	0	0
			109
,, ,, ,, £109 ,, =	81532	0	0
,, ,, ,, 10s. = ½ at £1 =	374	0	0
,, ,, ,, 4s. = ⅕ ,, =	149	12	0
,, ,, ,, 1s. = ¼ at 4s. =	37	8	0
,, ,, ,, ¾d. = 1/16 at 1s. =	2	6	9
	£82095	6	9 Ans.

3. What is the value of 48 sq. yds 5 sq. ft. 54 sq. in. at fourteen shillings and eightpence per sq. yd. ?

		£	s.	d.
Value of 1 sq. yd.		= 0	14	8
				48
,, 48 ,,		= 35	4	0
,, 4½ sq. ft. = ⅓	price of 1 sq. yd.	= 0	7	4
,, 108 sq. in. = ⅓	,, 4½ ft.	= 0	1	2⅔
,, 18 ,, = ⅙	,, 108 in.	= 0	0	2⅔
		£35	12	9½ Ans.

4. Divide £9 11s. 8d. among ten men, six women, and fourteen children, giving a woman three times as much as a child, and a man twice as much as a woman.

14 children get 1 share each = 14 shares
6 women ,, 3 shares ,, = 18 ,,
10 men ,, 6 ,, ,, = 60 ,,
Total 92

	s.	d.	
£9 11s. 8d. ÷ 92 =	2	1	child's share. Ans.
2s. 1d. × 3 =	6	3	woman's ,, Ans.
6s. 3d. × 2 =	12	6	man's ,, Ans.

Grammar.

1. Point out and parse all the verbs and adjectives in the following passage :—Then was King Alfred glad at heart, and he was strong and very courageous; for he knew that he would overcome his enemies by the help of God. So in the morning he arose, and sailing to the land he blew his horn three times, and his friends, hearing it, rejoiced, and his enemies, hearing it, feared greatly.

was—irreg. intrans. verb, *am, was, been*, indic., past, indef., 3rd pers., sing., agr. with '*King Alfred.*'
glad—predic. adj., qual. '*King Alfred.*'
was—same as above, agr. with '*he.*'
strong—predic. adj., qual. '*he.*'
courageous— ,, ,, ,,
knew—irreg. trans. verb, *know, knew, known*, indic., past., indef., 3rd pers. sing., agr., with '*he.*'
would overcome—irreg. trans. verb, *overcome, overcame, overcome*, potential, past, indef., 3rd pers., sing., agr. with '*he.*'
his—pronom. poss. adj., attrib. to '*enemies.*'
arose—irreg. intrans. verb, *arise, arose, arisen*, indic., past, indef., 3rd pers., sing., agr. with '*he.*'
blew—irreg. intrans. verb, *blow, blew, blown*, indic., past, indef., 3rd pers., sing., agr. with '*he.*'
his—pronom. poss. adj., attrib. to '*horn.*'
three—numeral adj., attrib. to '*times.*'
his—as before, attrib. to '*friends.*'
rejoiced—reg. intrans. verb, indic., past, indef., 3rd pers., plur., agr. with '*friends.*'
his—as before, attrib. to '*enemies.*'
feared—reg. intrans. verb, indic., past indef., 3rd pers., plur., agr. with '*enemies.*'

2. Point out the present participles in the above, and give the past participles of the same verbs.

The present participles with the past participles are :—*sailing, sailed; hearing, heard.*

3. Are the following adjectives compared here correctly :—learned, learneder; beautiful, beautifuler; holy, holier; amiable, amiabler; merry, merrier? Show what rule as to the comparison of adjectives is violated in some of the above examples.

The rule generally followed in comparing adjectives is as follows :—Monosyllables are compared by the terminations *er* and *est*, and words of more than one syllable by the adverbs *more* and *most*. However, dissyllables ending in y are often compared by *-er* and *-est*, and thus while *holier* and *merrier* are allowed, the others should be *more* learned; *more* beautiful, and *more* amiable.

Geography.

1. Describe fully the courses of the rivers which rise in the Cambrian range.

The *Severn* from Plynlimmon flows N.E. through Montgomery, E. and S.E. through Shropshire, S. through Worcester and Gloucester, and falls into the Bristol Channel. Its chief tributaries are the Teme, the Usk, Upper and Lower Avon.

The *Dee* from Arran Fowddy flows northward, separating Cheshire from Wales, and falls into the Irish Sea.

The *Wye* rises on the slopes of Plynlimmon, crosses Radnor and Herefordshire, divides Monmouth from Gloucestershire, and falls into the Bristol Channel.

The *Clwyd* flows through Denbigh and Flint into the Irish Sea.

The *Conway* forms the boundary between Caernarvon and Denbigh, and falls into the Irish Sea.

The *Teify* flows S.W. through Cardiganshire, separates Cardigan from Carmarthen and enters Cardigan Bay.

The *Ystwyth* flows W. through Cardigan into Cardigan Bay.

The *Taff*, the *Neath*, the *Tawe*, and the *Towy* all flow south into the Bristol Channel.

2. Say what you know about the islands and groups of islands lying near the coast of Great Britain.

If you can, draw a map to illustrate *one* answer, and insert the lines of latitude and longitude.

The *Orkney* and *Shetland Islands* form together one county north of the mainland of Scotland. The chief town of the Orkneys is Kirkwall; and of Shetland, Lerwick. The Orkneys are mostly low and fertile; the Shetlands mostly mere stacks of rocks.

The Hebrides form two groups lying along the West of Scotland. The Inner Hebrides lie close along the coast, and consist of Skye, Mull, Jura, Islay, Colonsay, and Oronsay, with some smaller ones: the Outer Hebrides are parted from the Inner by the Minch, the chief being Lewis, Harris, N. Uist, Benbecula, S. Uist, and Barra. Towns:—Portree in Skye, Bowmore in Mull, Stornoway in Lewis.

In the F. of Clyde lie Arran, Bute, Great and Little Cumbræ. Arran and Bute form the county of Bute, with Rothesay as chief town.

In the F. of Forth are the small islands of May, Bass Rock, Inchkeith, and Inchcolm. The Bell Rock lies off the mouth of the Tay.

The Isle of Man lies in the middle of the Irish Sea. Its chief towns are Douglas and Ramsey. The island retains its own government and judges. Its people are called Manx.

The Island of Anglesea forms a distinct county, and is separated from the mainland by the Menai Straits. Its chief town is Beaumaris. Another town, Holyhead on Holy Island, is the point of departure of travellers from England to Ireland.

Lundy Isle lies off Devonshire in the Bristol Channel.

The Scilly Islands are situated to the S.W. of Land's End. Only six are inhabited. The largest is St. Mary.

The Isle of Wight, south of Hampshire, famed for its beauty, is separated from the mainland by the channels of Spithead and the Solent. Its chief towns are Newport, Cowes, Ryde, and Ventnor.

The Channel Islands off the coast of France have belonged to England since the Norman Conquest. They consist of Jersey, Guernsey, Alderney, and Sark.

The Islands of Thanet and Sheppey in Kent are almost a part of the mainland.

The Island of Coquet, Fern Islands, and Holy Island (or Lindisfarn) lie off the shores of Northumberland.

Composition.

Write from dictation the passage given out by the inspector.

Penmanship.

Write, in large hand, as a specimen of copy-setting, the word *Incompatibility.*

Write, in small hand, as a specimen of copy-setting, *A Letter on the Spirit of Patriotism.*

FIRST YEAR.

Pupil Teachers at end of First Year.

Three hours and a half allowed.

MALES.

1. What fraction of £9 is $\frac{1}{2}$ of $\frac{9}{10}$ of half-a-crown?

$$\frac{\frac{1}{2} \text{ of } \frac{9}{10} \text{ of } 30\text{d.}}{2160\text{d.}} = \frac{\frac{27}{20}}{2160} = \frac{27}{4320} = \underline{\frac{1}{160}} \text{ Ans.}$$

2. Reduce $\frac{1}{2}+\frac{1}{3}+\frac{1}{7}\frac{1}{8}+\frac{9}{10}$ to a decimal fraction.

$$\frac{84+42+18+35}{252} = \frac{179}{252} = \frac{44\cdot75}{7\times9} = \frac{4\cdot97\dot{2}}{7} = \underline{\cdot71031746}. \text{ Ans.}$$

3. A man owns $\frac{3}{4}$ of $\frac{1}{2}$ of $\frac{1}{3}$ of a cargo worth £5161 3s. 9d., and sells one-sixth of the whole cargo; what will be the worth of the portion which remains to him?

$\frac{3}{4}$ of $\frac{1}{2}$ of $\frac{1}{3} = \frac{1}{8}$ or $\frac{9}{10}$; and $\frac{1}{6} = \frac{8}{10}$,
∴ by selling $\frac{1}{6}$ he has $\frac{1}{10}$ of the whole left.
$\frac{1}{10}$ of £5161 3s. 9d. = £172 0s. 9½d. Ans.

4. Subtract $\frac{1}{3}$ of $\frac{1}{4}$ from $\frac{1}{2}$ of $\frac{1}{11}$ and multiply the result by $\frac{5}{7}$ of $\frac{3}{5}$.

$$(\tfrac{1}{22}-\tfrac{1}{12})\times\tfrac{1}{14} = \frac{56-55}{132}\times\frac{1}{14} = \frac{1\times15}{132\times56} = \underline{\frac{5}{11088}}. \text{ Ans.}$$

FEMALES.

1. What would it cost to lay down a telegraph for 126 miles 3 fur. 15 po., if 4 miles 2 fur. 30 poles cost £2500?

4 mls. 2 fur. 30. po : 126 mls. 3 fur. 15 po. :: £2500 : ?
or or
1390 po. 40455 po.

$$\frac{£2500\times40455}{1390} = £\frac{101137500}{1390} = \underline{£72760\ 15\text{s.}\ 9\tfrac{3}{139}\text{d.}}\ \tfrac{90}{139}\text{ far.}$$

2. A bankrupt whose debts were £1200, only had sufficient to pay his creditors seven shillings and fourpence in the pound; how much had he?

£1 : £1200 :: 88d. : assets.
88d. × 1200 = £440.

3. If 5 needlewomen can do a piece of work in 11 days of 9 hrs. each, how long will it take 3 women to finish two such pieces of work, supposing them to work 10½ hrs. each day?

3 women : 5 women
1 piece : 2 pieces
10½ hrs. : 9 hrs.
:: 11 days : time required

$$\frac{11\text{ days}\times5\times2\times9\times2}{3\times21} = \frac{220}{7} = \underline{31\tfrac{3}{7}\text{ days.}} \text{ Ans.}$$

4. If a garrison of 3500 men have provisions to last for 54 days, allowing each man 2 lb. a day, how long would the same provisions last if 500 men were sent away, and the daily allowance increased to 2 lb. 4 oz. each man.

3000 men : 3500 men
36 oz. : 32 oz.
:: 54 days : time required.

$$\frac{54\text{ days}\times3500\times32}{3000\times36} = \underline{56\text{ days.}} \text{ Ans.}$$

Grammar.

1. Point out and parse all the pronouns in the following:—

'And missing thee I walk unseen
On the dry, smooth-shaven green
To behold the wandering moon
Riding near her highest noon
Like one that hath been led astray
Through the heavens' wide pathless way.'—MILTON.

Thee—pers. pron., 2nd pers., sing., com., obj., gov. by '*missing*.'
I—pers. pron., 1st pers., sing., com., nom. to '*walk*.'
her—pers. pron., 3rd pers., sing. fem. pos., attrib. to '*moon*.'
one—indef. pron., 3rd pers., sing., com., obj., gov. by (to) or '*like*.'
that—simple rel. pron., 3rd pers., referring to 'one,' sing., com., nom. to '*hath been led*.'

2. Point out all the objective cases in the above, and explain their government.

Thee is in the objective as the obj. of the action implied in '*missing*'; *green* is the object of the relation implied in *on*; *moon* is the object of the action implied in *behold*; *noon* is the object of the relation implied in *near*; *one* is the object of the relation implied in (to); and *way* the object of the relation implied in *through*.

NOTE.—*Near* and *like* are sometimes considered as adverbs governing the dative object.

3. Pronouns are said to be divided into two classes, substantive and adjective. Give the chief pronouns in each class.

The chief substantive pronouns are:—*I, thou, he, she, it, we, you, they; who, which, that, what; self.*
The chief adjective pronouns are:—*My, thy, his, her, its, our, your, their, my own*, etc.; *this, that, these, those; each, every, either, neither; some, any, one, all, such, other, several, divers; self.*

4. Why is the term adjective-pronoun open to objection? what ground is there for using it?

The term adjective-pronoun is contradictory, because a word can scarcely be considered an adjective and a pronoun at one and the same time; the term is retained because the words to which it applies are *pronouns* in origin, some of them, as *mine* and *thine*, being never used with a noun; others, as *my* and *thy*, never used without a noun, and because most of them are used as *adjectives*.

5. Why can prepositions be only placed before nouns, or words or phrases equivalent to nouns?

As things, and their actions and attributes, can only bear relation to other *things*; and as prepositions are employed to show this relation, therefore they can only be placed before a word that stands for a *thing*, that is, a *substantive*, or a word or phrase equivalent to a substantive.

Geography.

1. Describe fully the courses of the rivers rising in the Cambrian range.

See candidates' paper.

2. Draw a full map of Holland and Belgium, and insert the lines of latitude and longitude.

3. Name *one* seaport in each of the following countries, and describe the situation and character of each:—*Spain, Italy, the Austrian Empire, Russia, Germany.*

Cadiz, in the south of Spain, on the Island of Leon, is strongly fortified, and one of the best harbours in Europe.
Leghorn, a city and seaport of Tuscany, on the west coast of Italy. It ranks as the greatest commercial emporium in Italy, and embraces all the foreign trade of Tuscany.
Trieste, at the head of the Adriatic, stands on the Gulf of Trieste, which is 20 miles long, and of the same breadth at its entrance. It is a free port of Austria, with extensive commerce, and shipbuilding is extensively carried on.
St. Petersburg, the capital of Russia, is situated on both sides of the Neva. It is chiefly built of wood. Its commerce is extensive with all parts of the world, and it has regular steam communication with all the principal ports of Europe. The city is defended by the impregnable fortress of Kronstadt.
Hamburg, a free city of Germany, the greatest commercial emporium of the empire, and perhaps of the continent of Europe, is situated on the Elbe, about 70 miles from its mouth. It is intersected by several canals.

History.

1. Give the dates of Egbert, Alfred, Canute, and Edward the Confessor.

		A.D.	A.D.
Egbert reigned as King of England	from	827	till 836.
Alfred	,, ,, ,,	871	,, 901.
Canute	,, ,, ,,	1016	,, 1035.
Edward the Confessor	,, ,,	1042	,, 1066.

2. What sovereigns reigned between 1100 and 1272? Tell dates as well as names.

	A.D.
Henry I. began to reign	1100.
Stephen ,, ,,	1135.
Henry II. ,, ,,	1154.
Richard I. ,, ,,	1189.
John ,, ,,	1199.
Henry III. ,, ,,	1216 till 1272.

3. Make out a list of our rulers between James I. and Anne, with dates.

	A.D.
James I. began to reign	1603.
Charles I. ,, ,,	1625, executed 1649.
(Commonwealth	1649-1660.)
Charles II restored	1660.
James II. succeeded	1685, dethroned 1688.
William III. }	
Mary II. } ,,	1689.
Anne ,,	1702 till 1714.

Penmanship.

Write, in large hand, as a specimen of copy-setting, the word *Incompatibility*.

Write, in small hand, as a specimen of copy-setting, *A Letter on the Spirit of Patriotism*.

Composition.

Write from memory the substance of the passage read to you by the inspector.

SECOND YEAR.

Pupil Teachers at end of Second Year.

Three hours and a half allowed.

Arithmetic.

MALES.

1. In what time will £1275 amount to £1549 11s. at 3½ per cent. simple interest?

Interest = £1549 11s. − £1275 = £274 11s.

3½ : 274¼ } :: 1 year : time
1275 : 100 }

$$\frac{1 \text{ yr.} \times 5491 \times 100 \times 5}{20 \times 19 \times 1275} = \underline{5\tfrac{2}{3} \text{ years.}} \quad \text{Ans.}$$

2. Find the amount of 1895 guineas for 4¾ years at 2½ per cent.

$$\text{Interest} = £1989\tfrac{3}{4} \times 4\tfrac{3}{4} \times \frac{2\tfrac{1}{2}}{100} = \frac{£7959 \times 19 \times 11}{4 \times 4 \times 400}$$

$$= £259\ 18\text{s.}\ 2\tfrac{2}{11}\text{d.}$$

,, Principal ,, = £1989 15s. 0d.

∴ Amount = £2249 13s. 2 2/11 d. Ans.

3. What sum of money, lent at 5 per cent. simple interest, will produce, in 4 years, the same amount of interest as £250, lent at 3 per cent., produces in 6 years?

5 p.c. : 3 p.c. } :: £250 : sum
4 yrs. : 6 yrs. }

$$\frac{£250 \times 3 \times 6}{5 \times 4} = \underline{£225.} \quad \text{Ans.}$$

4. If a house contains property worth £17,230, and is insured for only 86·3 per cent. of its value, what sum does the owner lose in case of its destruction by fire.

Every £100 of the value loses £13·7.

$$\therefore \text{total loss} = \frac{£17{,}230 \times 13{\cdot}7}{100} = £2360{\cdot}51,$$

$$= \underline{£2360\ 10\text{s.}\ 2\tfrac{2}{5}\text{d.}} \quad \text{Ans.}$$

FEMALES.

1. Simplify $\dfrac{\frac{1}{2}+1\frac{1}{2}+2\frac{1}{4}}{\frac{1}{2} \text{ of } 1\frac{1}{2} - \frac{1}{3} \text{ of } \frac{1}{4}}$

$$\frac{\frac{1}{2}+\frac{3}{2}+\frac{9}{4}}{\frac{1}{2}-\frac{1}{12}} \times \frac{24}{24} = \frac{15+36+65}{24-8} = \frac{116}{16} = \underline{7\tfrac{1}{4}}. \quad \text{Ans.}$$

2. If ⅔ of a gallon of brandy be worth ⅞ of a gallon of whisky and whisky be worth 16s. 4d. per gallon, how many gallons of brandy can be bought for £71 16s. 3½d.?

⅔ gall. of brandy = ⅞ of 16s. 4d.
= 14s. 3½d.
∴ 1 ,, = 14s. 3½d. × ⅔ = 21s. 5½d.

£71 16s. 3½d. / 21s. 5½d. = 68943 / 1029 = 67 galls. of brandy.

3. A man spends ⅖ of his weekly wages in food, 1/10 in clothing, 9/70 in rent, 2s. 3d. in clubs, and lays by 1s. What are his weekly earnings?

⅖ + 1/10 + 9/70 = 42+7+9 / 70 = 58/70 part spent in food, clothing, and rent.

∴ 3/35 of whole = 3s. 3d., or the whole = 3s. 3d. × 35 / 6 = 18s. 11½d.

4. How much will it cost to clothe ten thousand soldiers, if a coat takes 1¾ yd., a pair of trousers 1½ yd., and a waistcoat ¾ yd., the price of the material being 16s. 9¾d. a yard, and the cost of making each suit 9s. 4d.?

1 suit = 1¾ + 1½ + ¾ = 4 yds.
Each suit costs (16s. 9¾ × 4) + 9s. 4d. = (67s. 3d. + 9s. 4d.)
= £3 16s. 7d.

				£	s.	d.
Value of 10,000 suits at £3 each =				30,000	0	0
,,	,,	15s.	,, = ¼ at £3 =	7500	0	0
,,	,,	15d.	,, = 1/12 ,, 15s. =	625	0	0
,,	,,	3d.	,, = ⅕ ,, 15d. =	125	0	0
,,	,,	1d.	,, = ⅓ ,, 3d. =	41	13	4
				£38,291	13	4

Grammar.

1. 'The rugged *mountain's* scanty cloak
Was dwarfish *shrubs* of birch and oak,
With *shingles bare* and cliffs *between*
And patches bright of bracken green
And heather black *that* waved *so high*,
It held the copse in rivalry.'—SCOTT.

(*a*) Parse all the words in italics.

(*b*) Is the sentence in the last line a principal or a subordinate sentence? Give the reason of your answer.

(*c*) What are verbs of incomplete predication? Give an example of one from the above, pointing out what is the complement of the predicate.

(*a*) *Mountain's*—Com. noun, neut., sing. poss., attrib. to '*cloak*.'
shrubs—com. noun, neut., plur., nom., in apposition with '*cloak*,' or nom. after '*was*.'
shingles—com. noun, neut., plur., obj., gov. by '*with*.'
bare—adj. qual. '*shingles*.'
between—prep. gov. (*them*).
that—simple rel. referring to '*heather*,' 3rd pers., sing. neut., nom. to '*waved*.'
so—adv. of degree, mod. '*high*.'
high—adv. manner, mod. '*waved*.'

(*b*) The last sentence, '(*that*) it held the copse in rivalry,' is a subordinate adverbial sentence of effect. It shows the effect of the high waving of the heather, and depends on the preceding

sentence for the meaning, entering into its signification like an adverbial phrase. The last two sentences might read together thus: 'It waved in rivalry with the copse.'

(c) Verbs of incomplete predication are those which do not make complete sense by themselves, but require some other word to be used with them to make the sense complete. 'Was' requires 'dwarfish shrubs of birch and oak' to complete the meaning; and 'held' requires 'in rivalry,' 'held the copse' not being sufficient to give the full meaning.

2. What are conjunctive adverbs? Why are they so called? Give examples of their use.

Conjunctive adverbs are such as both connect the sentence which they introduce with the preceding, and at the same time modify the verb in the sentence which they introduce; acting thus the part of both an adverb and a conjunction. They connect subordinate adverbial sentences with the principal; as, I shall go *when* I am ready. I waited *while* he wrote. The troops bivouacked *where* they fought.

Geography.

Answer Q. 2 or Q. 3; not both.

1. Draw a full map of Holland and Belgium, and insert the lines of latitude and longitude.

2. Give notes of a *first* lesson on 'The British Colonies,' describing generally their position and character, and pointing out for what purposes each of them is useful.

NOTE.—*Lesson to be given before a map of the world.*

DEFINITION OF COLONY.—Colony is a foreign possession peopled by emigrants from a parent state. A British colony is peopled by settlers from Britain, which is called the mother country. Explain difference between 'emigrant' and 'colonist,' difference between a colony and a dependency. Australia is, properly speaking, a colony; India, a dependency.

POSITION OF THE COLONIES.—British colonies are not confined to any quarter of the world, but are scattered over all parts of its surface. In Europe are Heligoland, Gibraltar (the key of the Mediterranean), Malta, in the Mediterranean. In Asia are India, Ceylon, Hong Kong, Straits Settlements, Aden and Perim. In Africa are Cape Colony and others in the south, and Sierra Leone and others on the West Coast. St. Helena, Ascension, and Mauritius, off the coast. In America are Canada, British Columbia, and the most of the Leeward and Windward islands of the West Indies, with Jamaica, Bahamas, Trinidad, British Guiana, Honduras, and the Falkland Islands. Australia and New Zealand.

CHARACTER AND VALUE OF THE COLONIES.—Colonies indirectly confer great advantages on the mother country. One of the most valuable is that they furnish a new home for thousands of poor, who find it a hard struggle to live in their own country. Canada, Cape Colony, Australia, and New Zealand are especially adapted for this. Others are valuable as stations for sheltering our fleets, and consequently protect our commerce; such are Heligoland, Gibraltar, Malta, Mauritius. Others are trading stations, in which raw produce from the surrounding countries may be collected, or from which English goods may be distributed to them. Singapore and the settlements in West Africa are of this character. Others are useful as stations or half-way houses at which ships may call to take in water or provisions or coal; for example, Gibraltar, St. Helena, Mauritius, Aden, and the Falkland Islands.

3. Write a letter, as from a young man travelling in Hindostan, describing the cultivation of the *Poppy*, *Indigo*, *Rice*, *Tea*, and *Pearl* fishing; and distinguishing the different parts of the country where each of these occupations is carried on.

Calcutta, 26th Aug., 1882.

SIR,—The *Poppy*, from which opium is produced, grows principally in Bengal, parts of Bombay, and Malwa. This plant is one of the important plants of India, its production and sale forming a Government monopoly. The narcotic known as opium is the thickened juice of a white poppy. This juice is obtained by scratching the seed-vessels while still unripe, when a milky fluid runs out, which hardens in the sun, and is then kneaded into balls, and packed in chests for export.

Indigo is chiefly produced in Bengal, in the delta of the Ganges. This plant is a native of India, from which country it takes its name. To obtain the dye, the plants are cut down when they begin to flower, and are steeped in water until they slightly ferment. When the fermentation ceases, the water is drawn off and violently agitated. It is then allowed to settle, and a thick sediment forms at the bottom, which sediment drained and dried is the indigo of commerce. The seeds are sown in spring at the rate of about a dozen pounds per acre. The plants grow rapidly, blossom in about three months, are cropped, and allowed to grow again. They are cropped a second, a third, and sometimes even a fourth time, when the process given above is gone through to procure the colouring matter.

Rice, which forms the staple food of the inhabitants, grows on the bank of the lower Ganges, and all around the sea-coast. Its cultivation requires an immense quantity of moisture, and grows best in fields which are, or can be, inundated. It is generally sown while the waters cover the land. The plants are also grown from cuttings, which are steeped in water first and then placed in the soil or mud brought down by the flooded river. When six inches high these are planted into rows one foot apart.

Tea is grown in the moist warm valleys of the Himalaya mountains, and particularly in Assam, where the plant was found growing wild. This plant is a hardy evergreen, from three to six feet in height. The plant is propagated by seeds on light, strong ground, and requires an abundance of light and air. The plants are sown five or six in a hole in rows four or five feet asunder. The first crop is gathered when the plant is three years old.

Pearls are procured from the inside of a species of oyster, found in great abundance on the rocky shores of the island of Ceylon. The oysters are generally found adhering to the rocks at a considerable distance below the surface of the sea, and are obtained by divers, who earn a precarious livelihood by this dangerous occupation. Loaded with weight sufficient to sink him the poor diver descends with a basket or bag, and after gathering as many oysters as he can, at a signal he is hauled to the surface, and the oysters are laid in pits to decay; because if the shells were forced open the pearls might be damaged.

I am, Sir,
Your obedient servant,
A TRAVELLER.

SECOND PAPER.

Two hours and a half allowed.

History.

1. Give the date of the Saxon Invasion, and explain what brought it about.

According to the common account the Invasion of Britain by the Saxons began in 449 A.D. After the departure of the Romans, the Britons found themselves unable to cope with the Picts and Scots, who broke in from the north and ravaged the country. In their despair they asked the aid of a band of Saxon sea-rovers, who, under the command of Hengest and Horsa, came to England, and obtained the Island of Thanet on condition that they fought their battles against the Picts and Scots. They defeated the enemies of Britain, and seeing the weakness of those who got their help, they invited others of their countrymen who came, and gradually the land fell an easy conquest to the bold but unscrupulous free-booters.

2. When and where was Magna Charta signed? Mention some of its provisions, and explain how the king came to accept them.

Magna Charta was signed by King John, at Runnymede, a meadow on the Thames, not far from Windsor, in June, 1215.

Some of the chief provisions of Magna Charta were these:—The king was not to demand or exact sums of money from the people without the consent of the Great Council of the nation, which council was to be called regularly and frequently. No freeman was to be imprisoned or have his goods taken from him but by the judgment of his equals, or by the law of the land; and no one, not even the villain or serf, was to be heavily fined for a small offence.

The king was forced to accept the Charter by the nobles and commons, headed by Stephen Langton.

3. When and by whom was printing introduced into England? Show the importance of that invention.

The reign of Edward IV. is distinguished by the introduction of printing, when, in 1474, Caxton set up a printing press in the Almonry of Westminster.

In all modern history no event has had wider or more lasting consequences than the invention of printing. A complete change took place not only in book-making but in the facility for diffusing learning. Since Caxton's time types have multiplied by millions, and printing presses by hundreds. A little silver coin can now buy the book for which Caxton charged a piece of gold. The British cottage is indeed a poor one which cannot show some volumes as well printed and as finely bound as his finest works. Without the invention of printing the spread of the Reformed doctrines must have been seriously checked, if not prevented, but the printing-press multiplied copies of the Bible at a rate and a cost which brought the Word of Truth within the reach of all classes. Neither the poet nor the philosopher, the historian nor the divine, could have made an impress on the spirit of his age without such an aid. Learning, instead of being as it now is the property of the many, must have been the exclusive privilege of the few.

Composition.

Write full notes of a lesson on *Bread*.

OBJECTS TO BE SEEN AND HANDLED.—*A wheat plant bearing seed—rye, oats, barley, all as seeds—chaff—wheat grain free from chaff—whole meal—bran—flour—yeast—bread—biscuits—oatmeal—and things of a kindred nature.*

WHAT BREAD IS MADE FROM.—Bread made from wheat—rye—oats—barley—principally from wheat—(*describe sowing—growing—reaping—and gathering wheat crops*)—grain freed from straw and ear—then from chaff—ground in a mill—bran taken from flour—whole meal a mixture of flour and bran—baked into brown-bread—flour sifted and given off in different degrees of fineness.

BREAD-MAKING—(1) *Setting the Sponge.* Baker puts as much flour as he requires into a bin—mixes this with water and yeast, and forms 'dough'—yeast causes dough to swell (why) and the 'sponge rises'—this mixture after sitting some time is mixed with salt which flavours it—lastly, it is mixed with more flour and water—thoroughly kneaded—and after some *fermentation* the dough is made into the form of loaves. (2) *Baking.*—The loaves are placed in the oven (describe)—heat of oven kills yeast—loaves take a longer or shorter time to bake according to the size of the oven—*ship biscuits* examples of unfermented bread. Oatmeal cakes made in Scotland—in Spain bread from chestnuts—in North and South America from maize.

Penmanship.

Write, in large hand, as a specimen of copy-setting, the word *Incompatibility*.

Write, in small hand, as a specimen of copy-setting, *A Letter on the Spirit of Patriotism*.

Euclid.

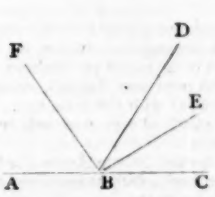
MALES.

[All generally understood abbreviations for *words* may be used.]

1. Upon the same base, and on the same side of it, there cannot be two triangles that have their sides which are terminated in one extremity of the base equal to one another, and likewise those which are terminated in the other extremity.

Prop. 7, Bk. 1.

2. DB meets the straight line ABC at B; BE BF bisect the angles DBC, ABD. Show that FBE is a right angle. (Apply Prop. 13.)



Because DBF, DBE are equal to half the sum of DBA, DBC, and since DBA, DBC are (Prop. 13) equal to *two* right angles, then DBF, DBE are together equal to *one* right angle.

Q.E.D.

3. The greater side of every triangle is opposite to the greater angle.

Prop. 18, Bk. 1.

Needlework.

FEMALES.

One hour allowed for this Exercise.

THIRD YEAR.

Pupil Teachers at end of Third Year, *if apprenticed on, or after, 1st May,* 1878; **and Pupil Teachers at end of Fourth Year,** *if apprenticed before that date.*

Three hours and a half allowed for this Paper.

Arithmetic.

MALES.

1. A man invested 9000 guineas in the 3 per cents. at 81, and sold out when they had sunk to 67½; what did he lose by the transaction?

He loses on every £100 stock £(81 − 67½), or £13½
∴ his total loss = £($13\frac{1}{2} \times \frac{9000}{100}$) = £1275 15s. Ans.

2. If 20 lbs. Troy of pure gold are coined into 934 sovereigns and a half-sovereign; and if standard gold contains 12 parts of pure gold to one part of alloy, what is the weight of pure gold in a sovereign?

Weight of sov. if all pure gold $= \frac{20 \text{ lbs.}}{934\frac{1}{2}} = \frac{115200}{934\frac{1}{2}}$ grs. $= \frac{230400}{1869}$ grs.
$= 123\frac{213}{1869}$ grs. Ans.

3. State the rule for working compound proportion, and explain the reason for it. If 15 horses and 148 sheep can be kept 9 days for £75 15s., what sum will keep 10 horses and 132 sheep for 8 days, supposing 5 horses to eat as much as 84 sheep?

Find the number which is of the same kind as the required answer, and place it in the third term, as in simple proportion.

Take any two terms which are of the same kind and consider these two with the third as a separate sum in simple proportion. If the answer is to be greater than the third term, put down the greater for the second term, if less, put down the less, and the remaining number for the first.

Then take other two terms which are of the same kind, and treat them with the third term, as another distinct sum in simple proportion. State it also according to the same rule. Proceed in the same manner till all the terms are disposed of.

Arrange all the separate ratios beneath the other; then multiply all the first terms together for a new first term and all the second terms together for a new second term.

Then multiply this new second term by the third, and divide by the first as in simple proportion.

The employment of this rule depends on the following principle:—

If there be three quantities so related that when all other things are equal the first varies as the second, and also when all other things are equal the first varies as the third; the variations of the first is as the product of the second and third.

Generally. If a increases as b increases, and also as c increases, then the total increase of a is as $b \times c$.

5 horses are equivalent to 84 sheep
∴ 1 horse is ,, 16¾ ,,
and 15 horses are ,, 252 ,,
,, 10 ,, ,, 168 ,,

15 horses + 148 sheep : 10 horses + 132 sheep
or
400 sheep : 300 sheep
9 days : 8 days
:: £75 15s. : ?

$\frac{£75\ 15s. \times 300 \times 8}{400 \times 9} = £50\ 10s.$ Ans.

4. Find the cost of papering a room 20 feet long, 16½ feet broad, and 12 feet high, the price of a piece of paper 12 yards long and 3 quarters broad being 4s. 6d.

area of side walls = (20 ft. × 12 ft.) × 2 = 480 sq. ft.
,, end ,, = (12 ft. × 16½ ft.) × 2 = 396 ,,
Total = 876 ,,
,, piece of paper = 36 ft. × 2¼ ft. = 81 ,,
81 sq. ft. : 876 sq. ft. :: 4s. 6d. : ?

$$\frac{54\text{d.} \times 876}{81} = \underline{£2\ 8\text{s.}\ 8\text{d.}}\ \text{Ans.}$$

FEMALES.

1. Divide ·2 by ·06 and 6·35 by ·425, each to 4 places of decimals, and prove the truth of each result by fractions.

(a) ·06)·200000
3·3333

Proof $\frac{\cdot 2}{\cdot 06} = \frac{2}{10} \div \frac{6}{100}$
$= \frac{2}{10} \times \frac{100}{6}$
$= \frac{2}{1} \times \frac{10}{6}$
$= \frac{2}{1} \times \frac{100000}{60000}$
$= \frac{200000}{60000} \times \frac{1}{100000}$

Now $\frac{200000}{60000} = 3\frac{3333}{6}$...from above
therefore the result $= 3\frac{3333}{10000}$
$= \underline{3{\cdot}3333}$...Ans.

·425)6·35(14·9411
4 25
2 100
1 700
4000
3825
1750
1700
500
425
750
425

Proof $\frac{6\cdot 35}{\cdot 425} = \frac{635}{100} \div \frac{425}{1000}$
$= \frac{635}{100} \times \frac{1000}{425}$
$= \frac{635}{1} \times \frac{1000}{4250}$
$= \frac{635}{1} \times \frac{10000}{42500}$
$= \frac{6350000}{4250} \times \frac{1}{10000}$

Now $\frac{6350000}{4250} = 1494\frac{11}{17}$...from above
therefore $\frac{1494\frac{11}{17}}{10000} = \underline{14{\cdot}9411}$...Ans.

2. What number added to the sum of
·0007 + 2·4 + ·05 + 3·0436 + ·047 will make an integer?

·0007
2·4
·05
3·0436
·047
5·5413

To make 5·5413 an integer we must add some decimal fraction to it to make 6.
Therefore 6 − 5·5413 = ·4587. Ans.

3. Add 4⅛, $\frac{123}{1000}$, $4\frac{3}{125}$, $5\frac{11}{1250}$, by vulgar and decimal fractions, and show that the results agree.

	V. F.	D. F.
$4\frac{1}{8}$ =	$4\frac{375}{1000}$ =	4·75
$\frac{123}{1000}$ =	$\frac{123}{1000}$ =	·246
$4\frac{3}{125}$ =	$4\frac{24}{1000}$ =	4·08
$5\frac{11}{1250}$ =	$5\frac{88}{1000}$ =	5·0088
	$\underline{14\frac{859}{1000}}$ =	$\underline{14{\cdot}0848}$. Ans.

4. A man has £3150 in hand having lost ·6 of his property in a farm, and purchased a house with ·125 of the remainder. What was he worth at first?

(a) After losing ·6 or ⅗ he has ⅖ remaining.
(b) ·125 of ⅖ = ⅛ of ⅖ = $\frac{1}{20}$ of the whole.
(c) ⅖ + $\frac{1}{20}$ = $\frac{9}{20}$ of the whole spent and lost; leaving $\frac{7}{20}$ of the whole in hand.

$$£3150 \div \tfrac{7}{20} = \underline{£\frac{3150 \times 20}{7} = £9000}.\ \text{Ans.}$$

Grammar.

1. 'Though I look old, yet I am strong and lusty;
For in my youth I never did apply
Hot and rebellious liquors in my blood:
Therefore my age is as a lusty winter,
Frosty, but kindly.'

(a) Point out the principal sentences in the above.
(b) In the first line which is the consequent cause, and which is the hypothetical or conditional clause? Why are such clauses so called?
(c) Point out the conjunctions in the above passage, and state to which class they belong.

(a) The principal sentences are (1) *I am strong and lusty;* (2) My age is as a lusty winter, frosty, but kindly.
(b) In the first line the consequent clause is 'I am strong and lusty,' and the hypothetical, 'I look old.' These sentences are so named from the ideas involved in their meaning; the conjunction 'though' introducing the conditional, and 'yet' the consequent clause. These clauses occur in reasoning, the one following as a consequence from the hypothesis.
(c) '*Though*'—subordinate, concessive, or conditional conj.
'*Yet*'—co-ordinate adversative ,,
'*For*'—subordinate causal ,,
'*And*'—co-ordinate copulative ,,
'*Therefore*' ,, illative ,,
'*As*'—subordinate adverbial ,,
'*But*'—co-ordinate adversative ,,

2. Into what classes may adverbial sentences be divided? Give an example from each class.

Adverbial sentences may be divided into those relating to:—
(1) *Time*, as, Every one listens *when he speaks.*
(2) *Place*, as, He stands *where I left him.*
(3) *Manner*, as, He did *as he was told.*
(4) *Degree*, as, *The more he learns*, the more he wishes to learn.
(5) *Cause*, as, He could not have seen me, *for I was not there.*
(6) *Purpose*, as, He labours *that he may grow rich.*
(7) *Condition*, as, *If your letter is finished* bring it to me.

3. What are the Latin prepositions which enter into the composition of each of the following words:—Collision, counteract, deluge, illusion, pellucid? Give the meaning of each preposition.

*Col*lision is compounded with *col* for *con* (together).
*Counter*act ,, ,, *counter* for *contra* (against).
*D*eluge ,, ,, *di* for *dis* (apart).
*Il*lusion ,, ,, *il* ,, *in* (into).
*Pel*lucid ,, ,, *pel* ,, *per* (through).

Geography.

Answer *two* questions.

1. Give notes of a lesson on the course of a ship sailing from Athens to Constantinople, round the Black Sea, and then, along the coast, to Alexandria.

Illustrate by a map, and insert the lines of latitude and longitude.

Leaving Athens, more famed for the ruins of its former greatness than for its present importance, we round Cape Colonna, with the remains of a temple of Minerva, and sail north up the channel of Negropont and Talanti, across which is a bridge connecting the island with the mainland. Leaving the channel, we skirt the Turkish shores northwards to Salonica, where a peninsula projects and divides into three parts, forming the Gulfs of Cassandro and Monte Santo, the latter name being also given to the peninsula, with monasteries strictly forbidding any being of the female sex to enter. Passing the Gulf of Contessa, and the Island of Thaso, we come to Enos, the port of Adrianople. We now reach the tongue of land which forms the western boundary of the Dardanelles. The entrance to this famous passage is defended by forts on either side.

The principal town on the European side is Gallipoli. Entering the Sea of Marmora we voyage to Constantinople (*a full description to be given*) on the Bosphorus, the entrance to the Black Sea, into which we sail, turning north to Cape Emineh, the termination of the Balkans, and Varna, whence the Crimean expedition set out in 1854. The coast now bends to the N.E. to the mouths of the Danube (*describe delta*). Continuing our course we come to Odessa, with grain exports; then to Kherson, where Howard died; and afterwards to Perekop, the key to the Crimea. *Crimea to be noted, also Eupatoria, the Alma, Sebastopol, Balaklava, Inkerman, etc.* Turn N.E. to Kaffa, pass Straits of Yenikale, to Kertch, and Taganrog, in our coasting the Sea of Azov. Returning through the Straits of Yenikale, and soon finish the European coast.

Continuing our voyage, we coast the southern shore of the Black Sea, and pass Poti, Batoum, Trebizond, Sinope, where the Turks were massacred by the Russians in 1853, Cape Baba, and reach Scutari, a suburb of Constantinople, famous for the hospital in which Miss Nightingale laboured. Proceeding through Sea of Marmora and the Dardanelles, we pass Besika Bay, the resort of our war vessels when the Russians threatened Constantinople, Smyrna (*note*), Isle of Rhodes, famous for its Colossus, Island of Cyprus, now a British possession, to Scanderoon, the port of Aleppo. Southwards we sail to Beyrout, the port of Damascus, Acre, Jaffa, and Gaza, and soon after by an easterly course we reach Port Said and Alexandria. (*Notes on the Nile, Delta, and Suez Canal.*)

2. Describe, as fully as you can, the rivers of Africa flowing into the Atlantic Ocean, mentioning how much has been found out about them by recent explorers.

The rivers of Africa flowing into the Atlantic are the *Senegal*, *Gambia*, *Niger*, *Congo*, and *Orange*.

Of these the *Senegal*, the *Gambia*, and the *Niger* have their origin in the mountains near the coast of Senegambia. In the rainy season the *Senegal* is navigable for about 600 miles, and in the dry season for about a fourth of that distance. The *Gambia* takes a winding course to the west, and is navigable for 400 miles, nearly the whole of its extent. The greatest of these rivers is the *Niger*, called by the natives in the upper part of its course the *Joliba*, and lower down the *Quorra*, enters the ocean by a number of mouths, the most distant of which are 200 miles apart. It is navigable for light vessels above Timbuctoo. The sources of this river were discovered in 1879 by a French expedition which started from the coast of Sierra Leone. Its head waters are formed by two streams, both of which have their origin in the Loma Mountains.

The *Congo*, the second in extent of basin and the greatest in volume of the African rivers—so characterized by Stanley who explored it in 1876–77—rises in the mountains above Lake Nyassa and falls into Lake Bangweolo, from which it issues under the name *Luapula* and flows north to Lake Moero. From the north side of this lake issues the *Lualaba*, which passes through a magnificent series of lake expansions, and receives numerous tributaries. About the place where this river crosses the equator there are six falls, and further on there begins a series of cataracts and rapids which interrupt the navigation for about 180 miles. Unlike most African rivers the Congo forms an estuary at its mouth. It is estimated to pour into the ocean a larger body of water than the Mississippi.

The Orange River, though it rises near the eastern coast and flows nearly across the Continent, passes for the greater part of its course through the desert, receives the Vaal, and is a shallow stream. The country on the Vaal has of late years attracted attention as the deposit of perhaps the richest diamond fields in the world. The obstructions in its bed are likely to hinder its ever becoming a great commercial highway.

SECOND PAPER.

Two hours and a half allowed.

History.

1. When and how were the Crowns of England and Scotland united?

The Crowns of England and Scotland were united in the person of James VI. of Scotland, who became James I. of England, 1603. James was by both father and mother's side great-grandson of Margaret, daughter of Henry VII., and as he was the next heir to the throne upon the death of Elizabeth, he succeeded without opposition.

2. Who was the last of our Stuart sovereigns? Give some account of the European wars of England in this reign.

Queen Anne was the last of our Stuart sovereigns, and in her reign was carried on the war of the Spanish succession, which continued from 1702 till 1713. In 1702 England declared war against France and Spain, and Marlborough was appointed to the chief command of the forces. His great assistant in the struggle was Prince Eugene of Savoy. The scenes of the conflict for the English forces were chiefly the low countries; the coast of Spain; the interior of Spain; and the West Indies. On the first two theatres of warfare brilliant success was obtained, but on the other the results were against the English. However, France was humbled in four great battles. At Blenheim, Marlborough defeated Marshal Tallard in 1704, at Ramilies he defeated Villeroi in 1706; in 1708 the French lost 15,000 men at Oudenarde, and at Malplaquet in 1709 a still bloodier victory was won. One of the most important achievements of the war was the capture of Gibraltar, 1704. The war lingered on till 1713, when the Treaty of Utrecht put a stop to it, and gave England Hudson Bay, Newfoundland, Nova Scotia, allowing her also to retain Gibraltar and Minorca, which had been taken from Spain.

3. What was the condition of England at sea during the war of American Independence? Describe the career and exploits of Rodney, and show their national importance.

During the War of Independence England saw Spain and France united against her (1779) and their fleets were for a time possessors of the sea. A French invasion of England was threatened, but it came to nothing. In January, 1780, our naval power re-asserted itself, when Admiral Rodney defeated the Spanish fleet off Cape St. Vincent. In 1782 again the French and Spanish fleets swept the Channel, for England had not yet risen to her full strength on the sea. Before the close of the war, however, another exploit of Rodney's redeemed the English name. In April, 1782, between the isles of Guadaloupe and Dominica, Rodney attacked and routed the French fleet under the Count de Grasse, sailing from Martinique to assail Jamaica. Five French first-rate ships of the line were taken, including the flag-ship with De Grasse on board, and one was sunk. Admiral Hood captured two more ships in the pursuit. An immense sum of money and the whole train of siege artillery were taken, and Jamaica was saved. Rodney was made a peer for this great service to the nation.

Algebra.

MALES.

1. Divide $\frac{3x^3}{2}-\frac{31x^2y}{12}+\frac{7xy^2}{8}-\frac{9y^3}{16}$ by $\frac{x}{2}-\frac{3y}{4}$

$$\frac{x}{2}-\frac{3y}{4}\Big)\frac{3x^3}{2}-\frac{31x^2y}{12}+\frac{7xy^2}{8}-\frac{9y^3}{16}\Big(\underline{3x^2-\tfrac{3}{2}xy+\tfrac{3}{4}y^2.}\quad\text{Ans.}$$

$$\frac{3x^3}{2}-\frac{9x^2y}{4}$$

$$-\tfrac{1}{2}x^2y+\frac{7xy^2}{8}$$

$$-\tfrac{1}{2}x^2y+\frac{4xy^2}{8}$$

$$\frac{3xy^2}{8}-\frac{9y^3}{16}$$

$$\underline{\frac{3xy^2}{8}-\frac{9y^3}{16}}$$

2. Find the G.C.M. of x^2+5x+4, $2x+x^2-8$, and $12+7x+x^2$.

Factorizing x^2+5x+4 we get $(x+1)(x+4)$

" x^2+2x-8 " $(x-2)(x+4)$

" $x^2+7x+12$ " $(x+3)(x+4)$

$\therefore$ $\underline{x+4}$ is the G.C.M. Ans.

3. Solve the equations:—

$$(1)\ \frac{5x-1}{2}-\frac{7x-2}{10}=6\tfrac{1}{2}-\frac{x}{2}$$

$$(2)\ \frac{10x+7}{18}=\frac{12x+2}{11x-8}+\frac{5x-4}{9}$$

(1) Clearing of fractions $25x-5-7x+2=66-5x$

$$25x-7x+5x=66+5-2$$

$$23x=69$$

$$x=\underline{3}.\quad\text{Ans.}$$

(2) Transposing, reducing to com. denr.

$$\frac{10x+17}{18}-\frac{10x-8}{18}=\frac{12x+2}{11x-8}$$

Subtracting fractions $\frac{25}{18}=\frac{12x+2}{11x-8}$

$$275x-200=216x+36$$
$$59x=236$$
$$x=4. \text{ Ans.}$$

Penmanship.

Write, in large hand, as a specimen of copy-setting, the word *Incompatibility*.

Write, in small hand, as a specimen of copy-setting, *A Letter on the Spirit of Patriotism*.

Composition.

Write from memory the substance of the passage read to you by the Inspector.

Euclid.

MALES.

[All generally understood abbreviations for *words* may be used.]

1. Define *rhombus, rhomboid, trapezium, parallel, straight lines, parallelogram.*

To draw a straight line through a given point parallel to a given straight line.

A *Rhombus* is a four-sided figure having all its sides equal, but its angles are not right angles.

A *Rhomboid* is a four-sided figure having its opposite sides equal, but all its sides are not equal, nor its angles right angles.

A *Trapezium* is a four-sided figure, but not a parallelogram. Some restrict the word trapezium to be a four-sided figure which has two of its sides parallel.

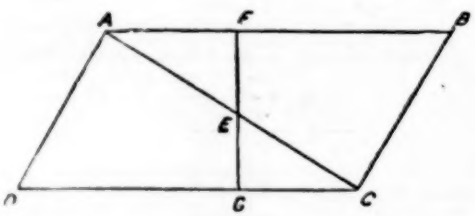
Parallel refers to the straight lines which are in the same plane, and which being produced ever so far both ways do not meet.

Straight lines are lines which lie evenly between their extreme points.

A *Parallelogram* is a four-sided figure which has its opposite sides parallel and equal.

(Prop. 31, Bk. I.)

2. Bisect a parallelogram by a line drawn at right angles to one of the sides.



Let ABCD be a parallelogram; draw the diagonal AC, which bisect in E (this may be readily done by means of the diagonal BD). From E let fall the perpendicular EG, and produce GE to meet AB in F. Then evidently the angle at F is a right angle since AB is parallel to DC.

Now because AE=EC, angle EAF=angle ECG, and the angle AFE=the angle EGC, then (I. 26) the triangle AFE=the triangle CGE. Again, since AC bisects the parallelogram (I. 34), then by substituting the one triangle for the other, the trapezium AFGD=the trapezium CGFB, that is, the parallelogram is bisected by FG, a straight line drawn perpendicular to one of the sides. Q. E. F.

3. Equal triangles upon equal bases in the same straight line, and towards the same parts, are between the same parallels.

(Prop. 40, Bk. I.)

FOURTH YEAR.

Pupil Teachers at end of Fourth Year, *if apprenticed on, or after,* **1st May, 1878; and Pupil Teachers at end of Fifth Year,** *if apprenticed before that date.*

Three hours and a half allowed.

Arithmetic.

MALES.

1. A creditor receives on a debt of £296 a dividend of 12s. 4d. in the pound, and he receives a further dividend upon the deficiency of 3s. 9d. in the pound. How much does the creditor receive in all?

First payment $=\frac{12\text{s. }4\text{d.}}{24\text{cd.}}$ or $\frac{37}{60}$ of the whole $=\frac{222}{360}$

Second ,, $=\frac{3\text{s. }9\text{d.}}{240}$ of $\frac{23}{60}$ or $\frac{3}{16}$ of $\frac{23}{60}$,, $=\frac{69}{960}$

Total payment equivalent to $\frac{651}{960}$

$\frac{651}{960}$ of £296 = £203 16s. 2d. Ans.

2. Divide £11,875 among A, B, and C, so that as often as A gets £4, B shall get £3, and as often as B gets £6, C shall get £5.

While A gets 4 shares or 8
and B ,, 3 ,, ,, 6
and C ,, $\frac{5}{6}$ of 3 or $2\frac{1}{2}$,, ,, 5
} total 19

∴ The proportions are

		£	£
A's,	$\frac{8}{19}$ of 11875	=	5000 Ans.
B's,	$\frac{6}{19}$	=	3750 Ans.
C's	$\frac{5}{19}$	=	3125 Ans.

3. Simplify these three expressions—

$$\frac{\frac{3}{5}\text{ of }\frac{4}{9}}{\cdot15+\frac{3}{8}};\quad\frac{4\frac{1}{3}}{2\cdot3};\quad\frac{\cdot284}{\frac{7}{8}\times\frac{1}{5}}$$

Give the answers in vulgar fractions.

(a) $\frac{\frac{3}{5}\text{ of }\frac{4}{9}}{\cdot15+\frac{3}{8}}=\frac{\frac{12}{45}}{\frac{3}{20}+\frac{3}{8}}=\frac{8}{37}\div\frac{21}{40}=\frac{8\times40}{37\times21}=\frac{320}{777}$ Ans.

(b) $\frac{4\frac{1}{3}}{2\cdot3}=\frac{13}{3}\div\frac{23}{10}=\frac{32\times10}{7\times23}=\frac{320}{161}=1\frac{159}{161}$ Ans.

(c) $\frac{\cdot284}{\frac{7}{8}\times\frac{1}{5}}=\frac{284}{1000}\div\frac{7}{40}=\frac{284\times35}{1000\times8}=\frac{497}{400}=1\frac{97}{400}$ Ans.

4. How much stock can be purchased by the transfer of £2000 stock from the 3 per cents. at 90 to 3½ per cent. stock at 96, and what change in annual income will be produced by the transfer?

(a) 96 : 90 :: £2000 : stock required.

$$\frac{£2000\times90}{96}=£1875$$

	£	s.	d.
Income in first case = £2000 × $\frac{3}{100}$	= 60	0	0
,, second ,, = £1875 × $\frac{3\frac{1}{2}}{100}$	= 65	12	6

∴ income is increased by £5 12 6 Ans.

FEMALES.

1. If I lend a friend £1200 at 4 per cent. simple interest, and tell him to keep it until principal and interest amount to £1666 13s. 4d., how long will he have it?

Interest for time = £1666 13s. 4d. − £1250 = £416 13s. 4d.

£4 : £416⅔ } :: 1 year : time
£1250 : £100 }

$$\frac{1\text{ yr.}\times1250\times100}{3\times4\times1250}=8\tfrac{1}{3}\text{ yrs. Ans.}$$

2. If a man can walk a certain distance in 32·5 days, walking 11·97 hours a day, how long will it take him to walk half that distance, walking 11·4 hours a day?

11·4 ho. : 11·97 ho. :: 16·25 days : time

$$\frac{16\cdot25\text{ days}\times11\cdot97}{11\cdot4}=\frac{194\cdot5125}{11\cdot4}=17\tfrac{1}{16}\text{ days. Ans.}$$

3. The 1st, 3rd, and 4th terms of a proportion are 3 cwt. 14 lbs., £1 7s. 1d., and £5 1s. 10d. respectively. Find the 2nd term.

3 cwts. 14 lbs. : ? :: £1 7s. 1d. : £5 1s. 10d.
or or or
350 lbs. : ? :: 325d. : 1222d.

$$\text{2nd term} = \frac{350 \text{ lbs.} \times 1222}{325} = 1316 \text{ lbs.} = \underline{11 \text{ cwt. } 3 \text{ qr.}} \text{ Ans.}$$

Grammar.

'Sweet are the uses of adversity,
Which like the toad, ugly and venomous,
Wears yet a precious jewel in his head,
And this our life exempt from public haunt,
Finds tongues in trees, books in the running brooks,
Sermons in stones, and good in everything.'—*As You Like It.*

(*a*) Point out the adjective sentence in the above and analyse it.

(*b*) The adjective sentence is generally attached to the word in the principal sentence which it qualifies by a relative pronoun. Is it ever so attached by any other kind of word? If it is, give an example.

(*c*) Parse all the pronouns in the above passage.

(*d*) Give the meaning of the passage in plain, simple words of your own.

(*a*) The adjective sentence is, '*Which like.....wears yet a precious jewel in his head.*'

(1) Which .....simple subject
(2) like the toad, ugly and venomous...enlargement of subject
(3) Wears .....predicate
(4) a jewel .....simple object
(5) precious .....enlargement of object
(6) in his head .....extension of predicate (place)
(7) Yet .....extension of predicate (concession)

(*b*) The adjective sentence is sometimes attached to the word in the principal sentence by a conjunctive-adverb, as, I got the book in the place *where* you left it.

(*c*) *Which*—simple rel. pron., referring to 'adversity,' 3rd pers., sing., neut., nom., subject of '*wears*.'
his—3rd pers. pron., referring to 'toad,' com., sing., pos., attrib. to '*head*.'
our—1st pers. pron., referring to speakers, com., plur., poss., attrib. to '*life*.'

(*d*) Our banishment from towns has deprived us of many of the conveniences of life, but just as the loathsome toad is said to have a jewel in his head, so our banishment has led us to learn many agreeable lessons from Nature's book.

2. What is the origin and meaning of the word 'case' as applied to nouns and pronouns? Compare it with declension.

Case, derived from Lat. *casus*, a falling, is an inflexion of nouns and pronouns for showing the relation which they bear to other words. The term case is also applied to denote certain grammatical relations of nouns and pronouns, even though these nouns and pronouns have *no distinct forms* to express those relations. There are three cases, the Nominative, the Possessive, and the Objective. The possessive is the only case of nouns that has a distinct 'falling away' from the 'upright line' of the nominative.

Declension is a term applied to the act of going through the cases of nouns, in both numbers, thus:—

Noun.		*Pronoun.*	
Singular.	Plural.	Singular.	Plural.
Nom. Man	Nom. Men	Nom. I	Nom. We
Poss. Man's	Poss. Men's	Poss. Mine	Poss. Ours
Obj. Man	Obj. Men	Obj. Me	Obj. Us.

3. Point out the Celtic or Scandinavian (Danish) element (stating which you believe it to be) in each of the following names:—Aberdeen, Balmoral, Pen-maen-Mawr, Caer-leon, Kilmarnock, Whitby, Caldbeck, Dalby, Mickleforce, Scawfell.

In Aberdeen, *Aber* (the mouth of a river) is Celtic.
„ Balmoral, *Bal* (a village) „ do.
„ Pen-maen-Mawr, *Pen* (a mountain) „ do.
„ Caer-leon, *Caer* (a fort) „ do.
„ Kilmarnock, *Kil* (a chapel) „ do.
„ Whitby, *-by* (a town) „ Danish.
„ Caldbeck, *-beck* (a brook) „ do.
„ Dalby, *Dal* (a vale), *by* (a town) are do.
„ Mickleforce, *-force* (a waterfall) is do.
„ Scawfell, *-fell* (a rock-hill) „ do.

Geography.

1. Draw an outline map of the Atlantic Ocean, and insert the lines of latitude and longitude.

2. Give full notes of a lesson on 'Central America.'

N.B.—*Do not waste time on introduction.*

NOTES OF A LESSON ON CENTRAL AMERICA.

Description and Situation.—Central America consists of a long, narrow, and irregular strip stretching from Mexico to the narrowest part of the Isthmus of Panama.

Size.—About 900 miles long, and from 70 to 350 miles broad.

Physical Features.—The mountains of three groups—the Honduras and Nicaragua group, the Costa Rica group, and the Guatemala group; some volcanoes in latter. Centre of country a lofty table-land, with a temperate climate; the coast low, hot, and unhealthy. Rivers of little consequence. The soil is very fertile.

Products.—Indigo, cochineal, mahogany, dye-woods, sugar, and cotton.

The chief industries are agriculture, mining, and cutting mahogany and other woods for exportation.

Divisions.—Guatemala, San Salvador, Honduras, Nicaragua, and Mosquito Coast, Costa Rica, and British Honduras. *Towns.*—New Guatemala, San Salvador, Leon, San José, and Belize.

Population.—Nearly three millions, consisting of Indians, Spaniards, and a mixed race.

Government.—Except in British Honduras—a British colony—the form of Government is republican, each of the five states being independent.

Religion.—Roman Catholic; other Churches tolerated.

Map should be drawn on blackboard.

SECOND PAPER.

Two hours and a half allowed.

History.

1. What events make the years 1172 and 1282 memorable in the history of the United Kingdom?

The year 1172 is memorable as being the year in which Ireland was nominally conquered by the English. Strongbow, Earl of Pembroke, Fitzstephen, and Fitzgerald, and latterly Henry II. himself, landed in Ireland. The king received the homage of the Irish Princes at Dublin, and on leaving the island he appointed Prince John to the Lordship of the country.

Llewellyn, Prince of Wales, refused to do homage to Edward I., and for five years the English king traversed the land with foreign troops. Llewellyn held out bravely, but his death from a lance-wound sealed the doom of Welsh independence, 1282.

2. A money-bill is, by the theory of the Constitution, a free grant made by the Commons to the Sovereign. Explain the importance of this principle.

As it is the people who pay the taxes, the representatives of the people in the House of Commons reserve to themselves the exclusive right to originate 'Money Bills' for taxing the people. The Commons, having not only the right to the expenditure of certain items, may oppose the granting of supplies until all grievances are redressed, and all necessary measures are passed for the good government of the people. No grievance of any magnitude could remain unredressed if supplies were refused as long as it existed.

3. It has been said that eight islands as well as thirteen colonies were lost to England by the Ministry of Lord North. Can you show the truth of this statement?

In 1770, on the proposal of Lord North, the Prime Minister, a duty of threepence a pound laid on tea was imposed for the purpose of asserting the right of the mother-country to tax the *thirteen* American Colonies. The taxed tea sent to Boston was thrown overboard by a party of enraged townsmen. This disturbance led to punishment, and the breach widened, till on the 4th of July, 1776, the revolted colonies, under the name of the United States of America, declared themselves independent of Great Britain. Finally, in 1783, Britain acknowledged their independence.

Lord North's administration lasted from 1770 till 1782. In 1772, by the Peace of Paris, Martinique, Cuba, and the Philippine Islands, were given up, the first to France, and the others to Spain. In 1783 Minorca was restored to Spain by the Treaty of Versailles.

Penmanship.

Write, in large hand, as a specimen of copy-setting, the word *Incompatibility*.

Write, in small hand, as a specimen of copy-setting, *A Letter on the Spirit of Patriotism*.

Composition.

Write a short essay on *Cruelty to Animals*.

Cruelty to animals consists in harshly treating either wild or domestic animals. Wild animals, such as game, are hunted by sportsmen, and though we may maintain that such animals were created for our enjoyment, yet we are not at liberty to set snares for them, by which they often die a lingering and painful death. In shooting birds, many a one merely wounded lives, perhaps, a few days, only to succumb. This unintentional cruelty on the hunter's part is cruelty, after all, and cannot be defended or excused. The hunting of the fox, though pursued passionately by the highest people in our country, is but a species of cruelty practised by the nobility, and cannot be defended any more than the hunting of cats by the cruel schoolboy. Pigeon-shooting, in which many of these gentle birds, instead of being killed outright, are merely maimed, and thus suffer excruciating agony, has been much condemned; but so long as ladies of refined feelings look on admiringly at these shooting and slaughtering displays, so long may we expect a continuance of this high-class sport.

Boys have been long notorious for plundering birds' nests, destroying young birds, torturing cats and other of the lower animals; and even men, who make use of poor old hacks for what is called horse-work, have to be watched in this most enlightened nation by officers of the Society for the Prevention of Cruelty to Animals.

Algebra.

MALES.

1. Simplify:—

(1) $$\frac{a+b+\frac{b^2}{a}}{a+b+\frac{a^2}{b}} = \frac{a^2+ab+b^2}{a} \div \frac{ab+b^2+a^2}{b}$$

$$= \frac{(a^2+ab+b^2)\times b}{a \quad \times (ab+b^2+a^2)}$$

$$= \underline{\frac{b}{a}} \quad \text{Ans.}$$

(2) $$\frac{ac+by+ay+bc}{af+2bx+2ax+bf} = \frac{ac+bc+ay+by}{af+bf+2ax+2bx}$$

$$= \frac{(c+y)(a+b)}{(f+2x)(a+b)}$$

$$= \underline{\frac{c+y}{2x+f}} \quad \text{Ans.}$$

2. Find the square root of $36x^4-36x^3+17x^2-4x+\frac{1}{9}$.

$6x^2$ | $36x^4-36x^3+17x^2-4x+\frac{1}{9}$ | $\underline{6x^2-3x+\frac{1}{3}}$ Ans.
$36x^4$

$12x^2-3x$ | $-36x^3+17x^2$
$-36x^3+9x^2$

$12x^2-6x+\frac{1}{3}$ | $8x^2-4x+\frac{1}{9}$
$8x^2-4x+\frac{1}{9}$

3. Solve the equations:—

(1) $ax-by=a^2$ or $abx-b^2y=a^2b$
$bx-ay=b^2$ or $abx-a^2y=ab^2$
by subtraction $y(a^2-b^2)=ab(a-b)$

$$\therefore \quad y = \underline{\frac{ab}{a+b}} \quad \text{Ans.}$$

by substitution $x = \underline{\frac{a^2+ab+b^2}{a+b}}$ Ans.

(2) $780x-73x+1=0$
factorizing $(60x-1)(13x-1)=0$
$\therefore \quad 60x=1$
$x=\frac{1}{60}$
or $13x=1 \therefore x=\frac{1}{13}$

Euclid.

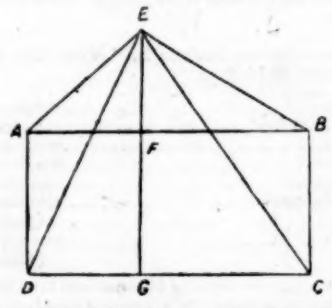
MALES.

Answer two questions, including (if possible) Q. 1.

[All generally understood abbreviations for *words* may be used.]

1. ABCD is a rectangle, E any point. Show that the squares on EA, EC are together equal to the squares on EB, ED.

From E let fall the perpendicular EFG, meeting AB in F, and DC in G. Then AF = DG, and BF = CG.



Now sq. on AE = sqs. on AF (DG) and EF.
and sq. on EC = sqs. on EG and GC.
that is, sqs. on AE and EC = sqs. on DG, EF, EG and GC.
Again sq. on EB = sqs. on EF and BF (GC)
and sq. on ED = sqs. on EG and DG.
that is, sqs. on EB and ED = DG, EF, EG and GC, but the sqs. on AE and EC were equal to the same four squares; therefore the sqs. on AE and EC = sqs. on EB, ED. Q. E. D.

2. If a straight line be divided into any two parts, the squares on the whole line and on one of the parts are equal to twice the rectangle contained by the whole and that part, together with the square on the other part.

Prop. 7, Bk. II.

3. In every triangle, the square on the side subtending either of the acute angles is less than the squares on the sides containing that angle by twice the rectangle contained by either of these sides, and the straight line intercepted between the acute angle and the perpendicular let fall upon it from the opposite angle.

Prop. 13, Bk. II.

Mensuration.

MALES.

1. A triangular field (whose sides are 350, 440, 750 yards) is let for £26 5s. a year; what is the rent per acre?

$$\text{Half perimeter} = \frac{350+440+750}{2} = 770 \text{ yds.}$$

$$\text{Area} = \sqrt{770\times(770-350)\times(770-440)\times(770-750)}$$
$$= \sqrt{770\times420\times330\times20}$$
$$= \sqrt{21344400000} \text{ sq. yds.}$$
$$= 46200 \text{ sq. yds.}$$

46200 sq. yds. : 4840 sq. yds. :: £26 5s. : rent

$$\frac{£26\ 5s.\times4840}{46200} = \underline{£2\ 15s. \text{ per ac.}} \quad \text{Ans.}$$

The Practical Teacher.

A MONTHLY EDUCATIONAL JOURNAL.

To Subscribers.—The *Practical Teacher* is published on the 25th of every month. Price 6d.; post free, 7½d.; sent post free, three months for 1s. 11d.; six months, 3s. 9d.; a year, 7s. 6d.

P. O. Orders should be made payable at Chief Office.

Subscribers not receiving their copies regularly are respectfully requested to write to the Publisher.

It would save time and expense if subscribers when remitting would state exactly what numbers they wish to be sent.

To Correspondents.—All literary communications should be addressed, THE EDITOR OF THE PRACTICAL TEACHER, Pilgrim Street, Ludgate Hill, London, E.C.

Accepted contributions are paid for within twenty-one days of publication.

The Editor cannot return rejected MSS.; authors should therefore retain copies.

TO ADVERTISERS.

Approved, *prepaid*, advertisements will be inserted in the *Practical Teacher* at the following rates:—

	s.	d.
20 words or under	3	0
Above 20 words and under 32 words ...	4	0
32 words and under 64 words	5	0
For every additional 10 words	1	0

Teachers Advertising for Situations.

	s.	d.
20 words or under	1	0
For every additional 10 words	0	6

For an ordinary page	4 guineas
For page facing matter	5 guineas.
For 2nd page of wrapper	5 guineas.
For 3rd page of wrapper	5 guineas.
For the page opposite the 3rd page of wrapper	5 guineas.
For the 4th (back) page of wrapper ...	6 guineas.

Parts of a page are charged at a slightly higher rate.—Special quotations will be given for a series.

☞ **Portfolios, fitted with elastic bands, for preserving twelve numbers of 'The Practical Teacher,' may now be had. Price 2s. 6d. Orders should be given through booksellers.**

Vol. I. of the *Practical Teacher* is now out of print.

Publications Reviewed.

The Food we Eat: Why we Eat it, and Whence it Comes. By J. Milner Fothergill, M.D. Griffith and Farran's Household Hand-books.

This is one of a series of manuals issued by Griffith and Farran, and entitled Household Hand-books. The general get-up of the book leaves nothing to be desired. It is well printed in a large type, the cover is elegant, and the binding good.

Everything written by Dr. Fothergill, a most prolific writer, is readable and instructive; but he suffers like many other authors from over-writing; and the book before us bears evidence of hasty composition, in its irregular marshalling of facts. Most of the chapters of this book originally appeared in the *Burlington Magazine*.

The first chapter on 'Why do we Eat?' is a rambling, chatty, and occasionally witty discourse on the social aspects of eating. We are treated among other answers to this question, to that of the young lady who says:—'What an absurd question to ask! Why, because mamma would send for the doctor if we didn't, and he would send some nasty tonic!' and to that of the sophisticated damsel, who exclaims—'It is so awfully jolly! oysters, game, and champagne with my dear Charlie. I could dance till doomsday!'

Such sketches, although possibly very appropriate in a fashionable magazine, seem somewhat out of place in a Household Hand-book. In fact, there is far too much concealment of useful information by sketches and disquisitions on irrelevant subjects. Thus in the succeeding chapter we have a detailed explanation, very ably worked out, of the reasons why a patrician gets gout on the slightest provocation, while an alderman usually escapes, however much he indulges.

In the fourth chapter our author describes honey as the only animal sugar we know of; but in a foot-note the editor says this is an erroneous expression, honey being a vegetable product stored up by the bees. This is not the only instance of the editor mildly taking Dr. Fothergill to task. In a later chapter our author makes the somewhat astounding and strikingly original assertion, that if Cain had not eaten Abel's sheep, we should still have been in the garden of Eden, and 'free from the Nemesis of the cook's art, the painful Podagra!' The editor gently suggests that the hypothesis that Cain killed Abel in a fit of gouty irascibility is not substantiated by the Hebrew record!

The later chapters of this work are much superior to the earlier, though the author's exuberant style and tendency to extravagances is irrepressible. The chapter on Fish is very good. We may echo Dr. Fothergill's exclamation, 'Verily indeed the inhabitants of the salt sea are numerous and toothsome!'

The chapters on 'Nursery Food' and 'Invalids' Food' are most excellent, and the book is well worth buying if only for these two chapters.

The chapter on the diet of A.D. 2000 is bold in conception. It will serve at any rate as a protest against the development of brain, at the expense of stomach and every other organ, which is rapidly becoming a serious matter.

We cannot recommend the book for use as a text-book in schools, or as a Household Hand-book. But it is an extremely readable book, which can be easily perused at odd intervals, and combines much amusement with abundant valuable hints and information.

Our Little Ones. September, 1882. London: Griffith and Farran.

In all respects this magazine maintains its high character.

Sectional Paper. London: Griffith and Farran.

Teachers of sewing will thank Messrs. Griffith and Farran for this cheap new quarter inch Sectional Paper. It is indispensable for teaching cutting out in classes, and ought to be used by every mistress.

The Reciter. Edited by A. H. Miles. London: Caudwell, Old Bailey, E.C.

This new venture deserves to succeed; it is wonderfully cheap, and contains judicious selections from some

of the best authors, dead and living. We especially commend Mr. Miles' Reciter to the notice of those teachers who contemplate giving entertainments during the coming winter.

Ledsham's Short Stories Cards. London: Simpkin and Co.

Every one who has had any experience as a teacher in an Elementary School knows how difficult it is to get the children in the upper standards to express themselves in fairly good English. These cards should do much to remove the difficulty. Cautions, explanations of words, and a paraphrase, accompany each story. We hope this modest-looking packet of cards will find its way into many schools, both at home and abroad.

My First Algebra. By M. H. Senior. London: Simpkin, Marshall and Co. Manchester: Greenwell.

This little introduction to Algebra up to Fractions is neat, clear, concise, yet thoroughly explanatory withal. It differs favourably from a host of so-called easy Algebras, which might be more correctly termed the Difficulties of Algebra Evaded. The clearness and simplicity of this little introduction will fully recommend it, together with the neatness of its printing and arrangement. It extends to factors and exercises preparatory to simple equations; quite far enough, we think, for first steps. In this we know we differ from many who advocate the early acquaintance with the doctrine of equations. But we question whether much satisfactory progress can be made by doing a few easy examples—pretty as they may be—without a good foundation in factors, and a fair mastery of the elementary rules. The method in which factors are treated by Mr. Senior is most commendable. By mastering these well-graduated preliminary lessons boys will have no difficulty in dealing with fractions, which we hope to see treated by Mr. Senior in the same lucid manner. The answers are put at the end according to the usual practice, whereby results may not be seen too easily.

Stories for Children from English History: For Standard III. of the New Code. London: Cassell, Petter, and Galpin.

The New Code arrangements, requiring reading books to be graduated and definite in design, is already producing a plentiful crop of new reading books. The one before us has the merits of being well got up, and written in a style most suitable for the class of intended readers. The lessons are arranged in most cases under biographical headings, and give interesting pictures of the different periods in which the historical personages figured. We need scarcely say that the events of each period or 'reign' are limited to the most striking occurrences. These are told generally with power and skill, and with remarkable fairness. We have in the chapter on Oliver Cromwell no absurd tirades against the leader of the Commonwealth, nor bitter revilings against Charles and the Royalists. With these general sketches young readers will be interested in their country, and desirous for further reading on the subject. This, we take it, is the proper course for introductory lessons in which minute information is undesirable. The book will do good educational service.

Marshall's English History Readers. Book II.—Early England. John Marshall and Co., 42, Paternoster Row.

To judge by the number of reading books on almost every subject, but especially on English History, the demand for such must be practically unlimited. The book before us has the merits of being well and simply written, and nicely illustrated and printed. It embraces the period known as Early England, and in this is included our history up to the death of Stephen and the succession of Henry II. There is little to criticise or to find fault with; the characters being treated with remarkable fairness. The writer is clearly convinced of the success of Dr. Freeman's attempt to teach even children to recognise the difference between what is true and what is legendary in history.

The story of Alfred is very charmingly told, and it is a pity that that prettiest of tales about his learning to read cannot possibly be true. That Alfred was a man of some education, great talents, and, best of all, of great nobility of character, no one would think of denying. But the story of Alfred's mother offering the beautiful book as a prize to her children, pretty as it is, must be relegated to the class of legends. Now Alfred was born in the year 849, and we are told that up to the age of twelve—*i.e.*, the year 861—he could not read. But his mother Osburga, and his father Ethelwulf, were both dead at this time; therefore it could not have been Osburga who offered the book to her children. But this is not all: by the year 861 Alfred's brothers were no longer children, but grown-up men, and two of them were already dead. To remove all doubt on the subject, however, Alfred had paid a visit to Rome before he was five, and his father had married his second wife Judith in the year 856, *i.e.*, when Alfred was about seven years old. And it is hardly a matter for surprise that Alfred was unable to read before he was seven.

The character of William the Conqueror is carefully dealt with, and the result is that we have a truthful portrait, freed from prejudice either in his favour or against him. One of the greatest marks of his statesmanship is omitted in this book. He at once recognised the necessity of reigning as king of the nation, and not merely as feudal lord. Therefore he caused the famous oath at Salisbury to be taken, by which *all* feudal tenants were bound to him by oath of allegiance. In conclusion, we must say that we are glad to meet with a reading book written so sensibly and in such excellent style as this. The English is simple and picturesque, and no pains have been spared by the writer to produce a really interesting and useful book.

Outline of the History of the English Language and Literature. London and Edinburgh: W. and R. Chambers.

This little manual is got up with the care and finish that mark the printing and binding of Messrs. Chambers' publications. It will be a valuable addition to our grammatical literature, and be an incentive to more extended reading. It is no mere compilation, but marked by originality and careful investigation throughout. In enumerating the sources of our present English, the author scarcely does justice to the number of Celtic (or Keltic we suppose we must follow the author in using) words that yet form a great portion of our common speech. Notwithstanding the incessant changes which our language has continually undergone, there are many hundreds of the words spoken by the Britons yet in common use. Doubtless the Norman French supplied very many of our common words, which the Welsh also borrowed, or had at least cognate forms, as *beer*, which was in Norman French *biere*, and in Welsh, *bir;* English *pear*, Teutonic or Norman French, *pera*, and Welsh, *per*—all pronounced nearly alike; and our English *one* is pronounced really more like the Welsh *un* than the Anglo-Saxon *aen*.

The west-country folk adhere to *un* in preference to *it*. 'Pick *un* up, bring *un* here,' etc. Now when we can point to numbers of such undeniably British words as *bacon*, *banner*, *barb*, *balderdash*, *bard*, *barley*, *barrel*, *base*, *basin*, *basket*—and here we must stop in the mere beginning of b's—surely more may be said of our indebtedness to Keltic sources. The author shows in regard to several late acquisitions that the spirit of our tongue in regard to

acquisitiveness is still active. All is grist that comes to our mill in the way of suitable and expressive words. All contributes to the force and fulness of a language destined, according to Grimm, to become 'the language of the universe.' To see clearly how this process has gone on, and how obsolete and cumbrous forms have been abandoned, which this book ably helps to point out, is well worthy the attention of young students.

A School Course of Heat. By W. Larden, M.A. London: Sampson Low and Co.

This most valuable compendium of experimental physics on the important subject of HEAT cannot fail, we think, of becoming a standard text book. It professedly deals with the demonstrations of formulæ, and the explanations of apparatus. The former of these comprise arithmetical examples in each case, supplemented by algebraical expressions. The latter comprise full descriptions, together with well-executed engravings of the most approved apparatus suitable for experimental proof or illustration. Although professing to avoid disputed theories, or those beyond the powers of ordinary students, explanations are in no wise wanting, and clearly given. The student is led by this treatise to take nothing for granted, but verify phenomena by experimental proof. We need scarcely say that this is true science as now understood, but it is also true that much science teaching is mixed up with improved assertions and speculative theories. Science is not identified with *what may be*, but *what is*, and this truth Mr. Larden carries out in the well-arranged book before us. The questions, mostly comprising arithmetical proof, are numerous, varied, and suitable. The explanations of ordinary phenomena will also be read with interest by others beside the regular student, as the following on CLOUDS and MISTS:—'True vapour is invisible. When this is condensed, it in general forms drops of water. If these drops are large they fall as rain, being heavier than the air. But the drops of water of which clouds are composed are small, and fall very slowly through the air, owing to its viscosity. Every cloud in still air is falling, but its slow fall is disguised by other and greater movements. A cloud then is not a true vapour, but a collection of matter, particles of water slowly falling as fine dust through the air.' In order to save space we have not quoted quite literally, but sufficiently as not to misrepresent the author's meaning. We simply regret that we have not space to quote much more of the writer's remarks on this *cloudy* subject, which he treats far from cloudily. Much more we would willingly quote, but we must, for the present at least, be satisfied with cordially praising this book.

Notes of Lessons on English Grammar for the Use of Teachers in Elementary Schools. By J. E. Singleton. London: Jarrold and Sons.

We are much pleased with this book, and believe it will be acceptable to teachers of all classes. The author has moved on the lines laid down by the Code at present in operation, and has wisely limited the early lessons for the younger pupils to the points required by the Code. Further details on each 'Part of Speech' are judiciously deferred to subsequent chapters or lessons. This we take to be conforming to the spirit of the Code as well as to its letter, and is also the proper method of dealing with grammar. This subject has perhaps suffered more than any other from exhaustive modes of treatment. In arithmetic, for instance, very easy sums are given for beginners, who are not bewildered with the demonstrative part of the science which unwise pedants would introduce. We are aware that there are 'Grammars for Beginners,' some of which are very meritorious, but in general too much is attempted on each branch of the subject in the early stages. Mr. Singleton avoids this error, and has an evident sympathy for children, in the painstaking efforts he makes to clear away difficulties and explain every step. In regard to the first steps, we have nouns developed by four lessons up to the distinctions of common, proper, and abstract. Verbs are similarly handled in three lessons, which include simple, auxiliary, and compound verbs. This will fairly suffice for the introduction to grammar required by the New Code for Standard II. We are particular in mentioning this, on account of complaints of grammar being too difficult for the early standards. With Mr. Singleton's help there need be no such objections to the teaching of this subject. The first eight lessons carefully taught and recapitulated will qualify the pupils of Standard II. to pass with ease and credit.

The book is well printed, in separate columns on each page; one of these columns comprises explanatory 'steps,' under the heading of METHOD. The other column, under ILLUSTRATIONS, contains special directions to the teacher. In some cases we fail to see the necessity for the second column, but in all cheerfully recognize the clearness, completeness, and soundness of the lessons. The first chapter treats of the classification of words, the second of their inflections, the third of parsing, the fourth of analysis, and the fifth—too briefly, we think—of the formation of words for the requirements of the Fourth Standard. In the Appendix we have our principal English prefixes given under the heading SAXON PREFIXES. It is something to get rid of the term *Anglo-Saxon*, but why not call this early form of our speech by the term *Old English?* We may expect to see in a second edition affixes also given, together with a few pages of derivations, so as to render this book not only eminently useful but thoroughly complete.

Science Notes.

PREVALENCE OF THE SALMON DISEASE.—The Tweed Commissioners give in their report a very gloomy account as to the ravages caused by the fungus parasite among the salmon. The past season has been marked by the unexampled severity with which the fish have been attacked. Last year the diminishing number of dead and dying fish taken from the Tweed led them to hope that the epidemic was in a fair way to disappear, but their expectation has unfortunately not been realized. This year the bailiffs have removed from the stream 14,627 dead or dying fish; in 1880 the number was 5,222, while last year it only reached 2,907. Of the large number so taken from the water in 1882, only 55 were not affected by the fungus. The disease is due to the growth of a species of *Saprolegnia*, akin to that which is frequently observed towards the end of the year clothing with its white threads so many dead flies.

* * * * *

FISH DISEASE IN THE RIVER VISTULA.—A mortality, which in its extent is comparable to the ravages of the *Saprolegnia* among the salmon, is reported in the *Voss'che Zeitung*. It has been noticed chiefly in the neighbourhood of Dantzig, where large masses of fish in an exhausted condition, half dead, have been found floating on the surface of the stream. In this case, however, it is no parasite that has caused the mischief, but this has been traced to the

pollution of the river by refuse from manufacturing establishments in its neighbourhood. Prominent among the sufferers are numbers of pike of large dimensions.

* * * * *

PREVENTION OF RIVER POLLUTION.—The Vistula outbreak makes those interested in fish culture turn their attention to the possibility of averting the pollution caused by manufacturing establishments. One of the chief manufactures which cause it is that of the finer class of paper, the chloride of lime which is used in the bleaching being the chief agent in the matter. It is possible now, in consequence of some very delicate tests invented by Mr. A. Nesbit, to detect the presence of as little as one two-hundredth part of a grain of commercial bleaching powder in a gallon of water, and to do this without any concentration of the liquid, just as it is raised from the stream. Now one to two grains per gallon are necessary to cause discomfort to the fish. Exposure to the air of the paper waste, diluted till it contains four grains of the chloride to the gallon, causes the deleterious properties to pass away in about four days. It is suggested that the paper-waste should be run into tanks and diluted about to the above extent before being allowed to flow into the stream. After being in these tanks for a few days it will not, on escaping, render the stream noxious to the fish. By this means it is hoped that the two conflicting interests of the fish and the manufacturers may be reconciled.

* * * * *

A POSSIBLE RIVAL TO SUGAR.—Among the many investigations in organic chemistry which have recently been carried out, one of the most interesting is that of Dr. Constantine Falberg. The body he has discovered he terms Anhydro-sulphamin-benzoic-acid. It is a white crystalline substance, very soluble in alcohol, but more sparingly so in water; its chief peculiarity being that it possesses a sweetness twenty or thirty times that of cane sugar. It is so powerful that the merest trace of its alcoholic solution in water gives a distinctly sweet taste to the liquid.

* * * * *

A NEW AMERICAN INDUSTRY.—A process is described from New York by which sugar can be manufactured from corn. It is attracting considerable attention in the Western States of America, where the question of transport of this produce is a serious consideration. The inventor claims that from each bushel of corn forty pounds of sugar can be manufactured. As the yield of corn is very large in the exceedingly fertile soil of those states, the importance of the discovery is great, should it eventually prove to be as satisfactory as at present seems probable. A company has been formed at Rochester, New York State, to work the process, and a sort of branch will be started in California.

* * * * *

FERTILITY OF OATS.—It is reported from North Nottinghamshire that on the farm of Mr. Foljambe, M.P., at Osberton, a stalk of oats has been gathered, the grains of which when counted were found to number no less than 634. The seed which has yielded such a remarkable result is of a specially prolific kind, which Mr. Foljambe's agent introduced from Yorkshire.

* * * * *

NEW APPLICATION OF THE MICROPHONE.—M. Serra Carpi has described, in a paper read before the Academy of Sciences of Paris, a new application of the microphone, to determine the position of the nodes and loops in columns of vibrating air. The microphone is mounted on an elastic membrane stretched over a little drum, and then into the sounding pipe. When the apparatus reaches a node, the telephone which is in circuit with the microphone, gives out, a rumbling sound similar to that caused by an induced current. On the other hand, when the microphone passes a loop, the sounds become very faint and rare, while at intermediate points they increase or diminish according as the microphone is nearer a node or loop. It is believed that the microphone may be made use of in this way in order to detect the presence and position of fire-damp in mines.

* * * * *

A RIVAL TO DYNAMITE.—A new explosive compound has been invented by Mr. E. Turpin, which is less liable to spontaneous combustion than dynamite, and is at the same time more powerful. It is composed of two liquids, both of which are quite harmless before being mixed. The name given to it is Panclastite.

* * * * *

REVIVAL OF SKATING RINKS.—Mr. J. D. Digby, at a recent meeting of the National Skating Association, of which he is secretary, drew attention to a new material for the construction of skating surfaces, the merits of which include the fact that it is a true substitute for ice, so that ordinary skates can be used upon it. He has had a small rink laid, and on trial of the surface he finds it to possess the two qualities needed for skating. When the surface by use has become rough, it can be refaced by a simple and inexpensive process. The cost of artificially producing ice for rink purposes is so great as to make it useless to do it on any large scale, but the new material can be laid for 20s. per square yard. Another advantage connected with it is that it may be laid either in a building or in the open air, as it is not affected by weather; moreover, after being used as a rink, the material will still have a marketable value. The patent is one

of Dr. McLeod's, and it is now proposed to form a company to acquire it, and to take up the manufacture of the material, to establish rinks, and to let out concessions for its use in different towns.

* * * * *

DANGERS OF ELECTRIC LIGHTING AVOIDED.—M. H. Geoffroy has brought before the Academy of Sciences of Paris a specimen of wire, clothed with asbestos and threaded through a leaden pipe, for the prevention of fires where electricity is employed for lighting. In an experiment tried by the engineer to the Faure Accumulator Co., the efficiency of the arrangement was proved by passing such a current through it that the wire, which was of copper, was completely volatilized, while the leaden pipe was not affected in the least.

* * * * *

NEW SOURCE OF CHEESE.—A German paper says that cheese is being made in Thuringia and Saxony from the pulp of boiled potatoes mixed with sour milk. The article so made has these advantages over cheese made in the ordinary way, that it does not engender worms, and keeps fresh for a number of years, provided that it is kept in a dry situation and in well-closed vessels.

* * * * *

THE CONGO EXPLORATION.—Mr. Stanley, who has for the past two or three years been at work upon the Congo, is expected to return to Europe very shortly. He has succeeded in many of the objects for which he has been striving; has erected four factories on ground which has been formally ceded to him by the native kings, and has made a road past the cataracts. M. A. Brazza proposes to construct a railway from the coast to Stanley Pool.

—o—

Publications Received.

Algebra—
(1) Senior's My First Algebra. Greenwell.

Arithmetic—
(1) Longmans' Arithmetic, Standards V., VI., and VII. Longmans.
(2) Answers to Arithmetic, Standards I. to VII. Longmans.

English Literature—
(1) Outline of English Language and Literature. W. and R. Chambers.
(2) Stories on Cards. J. B. Ledsham.
(3) Lady of the Lake, Canto II. W. and R. Chambers.
(4) Macaulay's Armada. W. and R. Chambers.
(5) Coleridge's Ancient Mariner. W. and. R. Chambers.

English Language—
(1) How to Write English, English Composition. Houghton.

English Grammar—
(1) Wright's English Grammar. Parts II. to VII., and complete. J. Heywood.
(2) Notes of Lessons on English Grammar. Jarrold and Sons.

History—
(1) Cassell's Historical Readers, Standard III. Cassell, Petter, and Galpin.
(2) Livesey's Notable Events in English History. Burns and Oaks.
(3) Blackie's Historical Readers, Standards II., III., and IV. Blackie and Son.
(4) Girling's Outlines of the History of England. Blackie and Son.

Miscellaneous—
(1) Dawson's Story of Earth and Man. Hodder and Stoughton.
(2) Sectional Paper for Cutting Out. Griffith and Farran.
(3) Facts to Impress: Fancies to Delight. Partridge and Co

Periodical Literature—
(1) Sports and Pastimes. VI. Cassell, Petter, and Galpin.
(2) Universal Instructor. XIII. Ward, Lock, and Co.
(3) Household Edition of Arabian Nights. Ward, Lock, and Co.
(4) Competitor. T. Fisher Unwin.
(5) Our Little Ones. Griffith and Farran.
(6) The Reciter. G. Cauldwell.

Poetry—
(1) Babcock's Lays from Over Sea. Stewart and Co.

Reading Books—
(1) Longmans' Fifth Illustrated Reader. Longmans.

Writing—
(1) Longmans' Modern Copy-Books. Nos. 7 to 12. Longmans.

—o—

THE RT. HON. H. FAWCETT, M.P., ON EDUCATION.—The Postmaster-General, in distributing the prizes last month at the Grocers' Company's Schools, said that he was one of those who gave a somewhat wide interpretation to education—attaching little value to the greatest intellectual success if it were not accompanied with a corresponding development of other qualities, or if the most precious of all gifts, a sound body, was sacrificed. Intellectual and physical development should go hand in hand, helping each other, and the man was not to be congratulated who found that he had attained intellectual success at the purchase of his physical health. He thought it was a great mistake to estimate knowledge simply by the practical or pecuniary use to which it can be turned in after-life. At school and college he studied mathematics more than any other subject, but since that time the circumstances of his life had been such that he believed few people had devoted less attention to mathematics than he had in after-life. Yet, if he could see his time over again, he would not devote less time to this subject, because, though he had not been in a position to practically apply the science, he felt the benefit of this mathematical training every day of his life. He had no hesitation in saying that, whatever a man's life might be, if he had acquired the knowledge of some natural or physical science he possessed an inexhaustible source of the purest enjoyment in life. It was only the other day he was speaking to a gentleman who holds an official position in the department with which he (the speaker) was connected, and he found this gentleman was an enthusiastic botanist, and a great lover of natural history. Of course, he never had an opportunity of using his knowledge of botany in the official work of the Post-office; but having this intellectual recreation outside his official life, instead of interfering with official work, he would venture to assert that it made this gentleman a better official. Considering the struggle for life, it was most important that the practical side of education should not be lost sight of. He thought that at school there was a happy blending of the theoretical and practical in education. He was glad to notice that shorthand was among the subjects taught. Nothing had struck him more than the numerous applications made for clerkships or posts of private secretary, and yet few of these applicants were found to write shorthand. There was scarcely a pursuit of a commercial kind in which shorthand was not of the greatest utility.

Query Column.

☞ As the answer to a single question often entails an expense six or seven times greater than the cost of the complete key to any of the Arithmetics or Algebras ordinarily used, the Proprietor of this Journal would be glad if students confined themselves to questions, the full working of which is not published in the form of a 'key.'

RULES.

1. Each correspondent is restricted to *one question*. We should be much obliged if correspondents who send numerical or algebraical questions for solution, and are able from any source to give the required answer, would do so. It would save much time at present spent on verification.

2. No query can be answered unless accompanied by the real name and address of the sender, not necessarily for publication, but as a guarantee of good faith and for facility of reference.

3. Replies will not be sent through the post.

4. Correspondents are requested to write *legibly*, and on one side of the paper only.

5. Correspondents wishing us to recommend books for any (other than the ordinary Government) Examinations, or to answer any questions concerning that Examination, must, in all cases, send a copy of Regulations up to date.

6. Queries must reach the office *not later than the 15th of the month*, or they cannot be attended to in the following issue.

7. All queries in future must have a pseudonym, and must be written on a slip of paper other than that which bears the real name and address of the sender.

*** All communications for this column should be addressed

'The Query Editor,'
The Practical Teacher,
Pilgrim Street, Ludgate Hill,
London, E.C.

General.

1. GLADIOLA.—*Stock* may be defined to be the capital of trading companies; or to be the money borrowed by our or any other Government, at so much per cent., to defray the expenses of the nation. From a variety of causes prices of stock continually change.

Shares are originally fixed at a certain price, and then according to the success or failure of the company, and the probable amount of dividend it will pay, the value of the shares fluctuates. Purchases or sales of stock are generally made through brokers, who charge £¼, or 2s. 6d., per cent. upon the stock bought or sold. So that in practice, when stock is bought by any party, every £100 stock costs that party £¼ more than the market-price of the stock; and when stock is sold, the seller gets £¼ less for every £100 stock sold than the market-price. This charge is called *brokerage* or *commission*.

The number or quantity which is produced by reckoning a certain rate per cent. upon any given number or quantity is called the *percentage*.

2. KATHIE.—'Let my gaze be fixed on something.'

Let—Verb, irreg., trans. act., imper., pres. indef., sing., 2nd., agreeing with its subject 'thou' (understood).
my—Pro., per., 1st., com., sing., poss. case, governed by the noun 'gaze.'
gaze—Noun, abs., neut., sing., obj. by the verb 'let.'
be fixed—Verb, reg., trans. pass., infin. mood, indef. tense, and governed by the verb 'let.'
on—Prep., gov. the noun 'something,' and relating the verb 'be fixed' to 'something.'
something—Noun, com., neut., sing., obj. by the prep. 'on.'

3. BEDOUIN.—You will find the solution of your query in our issue for May.

4. P. A., Leeds.—

'There be some sports are painful; but their labour
Delight in them sets off.'

labour—noun, abs., neut., sing., obj. by the verb 'sets off.'
delight—noun, abs., neut., sing., nom. to the verb 'sets off.'
sets off—prepositional verb, irreg., trans., act., indic., pres. indef., sing., 3rd., agreeing with its subject, 'delight.'

5. ROMULUS.—P. Huxley. A. L. and H. Tyndall and Guthrie.

6. F. S. BURTON.—Consult any ordinary School Geography.

7. A READER.—If you mean for an English certificate, No; but any examination you have passed in England would be helpful to an Australian certificate. Write to the agent of one of the Australian Colonies, Victoria Street, Westminster, S.W.

8. RALPHO, St. Vigeans.—(1) No. Elementary branch not recognised. (2) Impossible to give information on subject. Kept secret.

9. EGYPTIAN.—Near its source.

10. LBARWOSWONN.—(1) We think under the 'New,' but you had better consult your Inspector. (2) Royal.

11. NOMEN.—Apply to Secretary of Education Department for Syllabus.

12. CISSIE.—Each Inspector sets his own questions. They are sent to us by the courtesy of teachers. An excellent selection of Grammatical and Geographical Questions, with full answers, will be found in *Hughes's* 'Handbook of Examination Questions,' price 5s., post free.

13. SWANTON.—Purely Elementary.

14. LOUIE.—Music, *Sutton*; Cookery, *Gothard*, 2s. 6d. For origin of words in Macbeth, and Cutting Out, see present volume of *Governess*. Messrs. Griffith and Farran publish a capital little handbook on Plain Cutting Out.

15. LEHRER, Aberdeen.—Soon after the accession of Henry IV. to the throne vacated by Richard II., those peers who had appealed against the Duke of Gloucester, and had been mainly instrumental in his murder, were summoned to exculpate themselves. This they did by alleging their actions to have received the sanction of Richard II. and his Parliament. After a tumultuous hearing, during which forty gauntlets were thrown on the ground as challenges to combat, Henry IV. decided to divest the '*Lords Appellant*,' as they were called, of the titles which Richard had bestowed on them as rewards, and the *Dukes* of Albemarle, Surrey, and Exeter, the *Marquis* of Dorset, and the *Earl* of Gloucester, accordingly became once more the *Earls* of Rutland, Kent, Huntingdon, and Somerset, and *Lord* Le Despencer.

16. PRECEPTOR.—'English Grammar,' *Mason's*, 3s. 6d. (Bell and Sons); or *Tidmarsh's* 'Practical English Grammar,' 2s. 6d. (Rivingtons). 'English Composition,' *Dalgleish's*, 1s., or with advanced 'Text Book,' 2s. 6d. (Oliver and Boyd); or *Johnston's* 'Civil Service Essay and Composition Writing,' 3s. 6d. (Longmans); *Roget's* 'Thesaurus of English Words,' 10s. 6d. (Longmans); or *Smith's* 'Synonyms and Antonyms,' 5s. (Bohn).

17. DUWINYDD.—Your question is of a class not often sent to us. It should have been forwarded to a religious paper. We

may add, however, that justification by faith has its foundation in the teaching of St. Paul and St. James, and is constantly referred to in their writings.

18. DOMINICA.—The term *Paladin* was derived originally from the Counts *Palatine*, or Counts *of the Palace* (from Lat. *Palatium*, a palace), who were the highest dignitaries in the Byzantine and Merovingian Courts, and then used generally for a lord or chieftain.

19. D. T. Z.—(1) C's portion = $\frac{1}{2}$ of $\frac{1}{3}$ of estate + $\frac{1}{3}$ ($\frac{1}{4}$ of estate − £500).
= $\frac{1}{12}$ of estate + $\frac{1}{30}$ of estate − £100.

You must take $\frac{1}{3}$ of the quantity in brackets. Now $\frac{1}{3}$ of $\frac{1}{4}$ of estate = $\frac{1}{30}$ of estate, and $\frac{1}{3}$ of £500 = £100.

(2) The most handy instrument for drawing curved lines for latitude and longitude in an examination, is a piece of round wood or cane bent like a bow by a piece of string,

20. ENQUIRER.—'See, here's a bower of eglantine, with honeysuckles woven.'

See—verb, irreg., trans., act., imper., pres., indef., sing., 2nd, agreeing with its subject 'thou' (understood).
here—adv. of place, mod. the verb 'is.'
is—verb, irreg., intrans., indic., pres., indef., sing., 3rd, agreeing with its subject 'bower.'
a—adj., demons., qual. the noun 'bower.'
bower—noun, com., neut., sing., nom. to the verb 'is.'
of—prep., gov. the noun 'eglantine,' and relating the noun 'bower' to 'eglantine.'
eglantine—noun, com., neut., sing., obj. by the prep. 'of.'
with—prep., gov. the noun 'honeysuckles,' and relating the part. 'woven' to 'honeysuckles.'
honeysuckles—noun, com., neut., plur., obj. by the prep. 'with.'
woven—part., perf., from the verb 'to weave,' trans. pass., qual. the noun 'eglantine.'

21. JONAS ORAGMUS, Wigan.—You must have the segments of the diagonal EB for the solution of your query.

22. S. INGHAM.—Your solution of the deduction is very neat and simple.

23. ARNO.—There is no sense in your query.

24. OMICRON, Sheffield.—You will find the solution of your query in our issue for April.

25. NERO, Pontypridd.—We believe you have copied the question incorrectly. Would you kindly repeat it?

26. ASSISTANT MISTRESS.—We regret to state that owing to the serious illness of the author who undertook to annotate Byron's 'Childe Harold,' that work has not appeared in our pages.

27. UTOR NON ABUTOR.—Ans. Widnes.

28. J. WILDGOOSE.—It is impossible to answer your query, a you do not state which branch of the Civil Service you refer to Get one of the excellent Civil Service Manuals, issued either by Longman, or Crosby Lockwood and Co. You will there find all you want.

Mensuration.

1. MUSE.—A gentleman had a garden 100 feet long and 80 feet wide. A walk was made half way round it, that took up half the ground. Find, without the use of algebra, the uniform width of the walk.

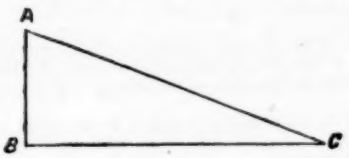
Area of walk = $\frac{100 \times 80}{2}$ sq. ft.
= 4000 sq. ft.

But area of walk = {100 × width + (80 − width) × width} sq. ft.
= (100 width + 80 width − width²) sq. ft.
= (180 width − width²) sq. ft.

∴ 180 width − width² = 4000
Width² − 180 width = −4000
Width² − 180 width + (90)² = 8100 − 4000 = 4100
Width − 90 = ±64·031...
∴ Width = 90 ± 64·031...
= 154·031... or 25·968...

It is evident that the value of 154·031 is inapplicable.
∴ Width of walk = 25·968...ft.

2. A BEGINNER IN MATHEMATICS.—One side of a right-angled triangle is 3925 feet; the difference between the hypotenuse and the other side is 625 feet; find the hypotenuse and the other side. (*Todhunter.*)



If AB = 3925, then AC = BC + 625.
AC² = AB² + BC², (I. 47.)
(BC + 625)² = (3925)² + BC²
BC² + 1250 BC + 390,625 = 15,405,625 + BC²
1250 BC = 15,405,625 − 390,625
1250 BC = 15,015,000
∴ BC = 12,012.

∴ Other side = 12,012 ft., and hypotenuse
= (12,012 + 625) ft. = 12,637 ft.

Note.—(1) There is no rule; the factors are generally found by inspection. It is very useful to notice the following facts:—
$x^n - a^n$ is divisible by $x - a$ whether the index n be an *odd* or *even* whole number.
$x^n - a^n$ is divisible by $x + a$ if the index n be an *even* whole number.
$x^n + a^n$ is divisible by $x + a$ if the index n be an *odd* whole number.
(2) Write to the Secretary of the College. (3) Through any bookseller.

3. BURRA BURRA.—One side of a triangle is half the sum of the two others, the sum of the three sides is 84 yards, and the area of the triangle is 14 square yards. Find the sides. (Pupil Teacher's Examination, *October*, 1880.

Area of triangle = $\sqrt{s(s-a)(s-b)(s-c)}$, where a, b, c = sides, and s = half sum of sides.

$a + b + c = 84$, and $b + c = 2a$,
∴ $3a = 84$
∴ $a = 28$, and $b + c = 56$.
$14 = \sqrt{42(42-28)(42-b)(42-c)}$
$196 = 42 \times 14\ (42-b)\{42-(56-b)\}$
$\frac{1}{3} = (42-b)(b-14)$
$= 56b - b^2 - 588$
$b^2 - 56b = -588\frac{1}{3}$
$b^2 - 56b + (28)^2 = 784 - 588\frac{1}{3}$
$= 195\frac{2}{3}$
$b - 28 = \pm 13{\cdot}988...$
$b = 28 \pm 13{\cdot}988...$
∴ $b = 41{\cdot}988...$ or $14{\cdot}011...$

∴ Sides of triangle = 28, 14·011... and 41·988 .. yards. Ans.

Arithmetic.

1. ALPHA.—What is the annual interest on £76,978, bought into the Danish 3½ per cents. at 77, and what sum would be gained by selling out at 77½? (*Colenso.*)

£ 77 : £ 76,978 :: £ 3½ : Income
£1 : 6,998 : $\frac{2}{7}$
∴ Income = £3,499. Ans.

£ £ £
77 : 78,978 :: ¼ : Gain
7 6,998
∴ Gain = £$\frac{6998}{28}$
= £874 15s. Ans.

2. B. O. Y.—12 lbs. of tea and 25 lbs. of coffee together cost £4 6s. 8d.; but if tea were to rise 2½ per cent. and coffee to fall 4½ per cent., the same quantities would cost £4 5s. 11d. Required the prices of tea and coffee per lb.

12 lbs. of tea and 25 lbs. of coffee cost £4 6s. 8d.
12 lbs. of tea at 2½ per cent. increase and 25 lbs. of coffee at 4½ per cent. decrease cost £4 5s. 11d.
∴ Cost of 25 lbs. of coffee at $\frac{9}{40}$ of original price
− cost of 12 lbs. of tea at $\frac{1}{40}$ of original price
= £4 6s. 8d. − £4 5s. 11d.
= 9d.
∴ Cost of 25 lbs. of coffee at original price − cost of 12 lbs. of tea at ($\frac{1}{40} \times \frac{9}{40} = \frac{1}{8}$) of original price = ($9 \times \frac{40}{8}$)d.
∴ Cost of 25 lbs. of coffee − cost of ($12 \times \frac{1}{8}$) lbs. of tea = 200d.
Cost of 25 lbs. of coffee + cost of 12 lbs. of tea = 1040d.
" " − " 6½ " = 200d.
∴ (By subtraction),
Cost of 18½ lbs. of tea = 840d.
∴ Cost of 1 lb. of tea = ($840 \times \frac{2}{37}$)d.
= 45d.
= 3s. 9d. Ans.
Cost of 25 lbs. of coffee + (45 × 12)d. = 1040d.
Cost of 25 lbs. of coffee = 1040d. − 540d.
= 500d.
∴ Cost of 1 lb. of coffee = 20d.
= 1s. 8d. Ans.

3. O. H. F.—What is the price of the 3 per cent. stock, when after paying 4d. in the pound income-tax, it yields 3½ per cent. interest?

s. d. £ £
19 8 : 3½ :: 1 : percentage with income-tax
3 60
59 210
= £3$\frac{3}{59}$.
£ £ £
∴ 3$\frac{3}{59}$: 3 :: 10ℓ : price of stock
59
177
7
= £$\frac{590}{7}$ = £84$\frac{2}{7}$. Ans.

4. YELSERP.—The gross receipts of a railway company in a certain year are apportioned as follows: 41 per cent. to pay the working expenses, 56 per cent. to give the shareholders a dividend at the rate of 3½ per cent. on their shares, and the remainder, £15,000, is reserved; find the paid-up capital of the company. (*Barnard Smith.*)

{100 − (41 + 56)} per cent. of the gross receipts = £15,000,
3 per cent. of the gross receipts = £15,000;
∴ amount for dividend = (15,000 × $\frac{3}{7}$) £
= £280,000;
∴ capital of company = £280,000 × $\frac{100}{3\frac{1}{2}}$
= £280,000 × $\frac{200}{7}$
= £8,000,000. Ans.

5. P. T., Brierley.—A certain field will graze 2 oxen and 3 horses for 21 days, or 3 oxen and 2 horses for 19$\frac{19}{21}$ days; compare the appetite of an ox and a horse.

The field will graze 2 oxen and 3 horses for 21 days,
∴ " " " (2 oxen and 3 horses) × 21 for 1 day,
= 42 oxen and 63 horses " "
" " " 3 oxen and 2 horses for 19$\frac{19}{21}$ days,
∴ " " " (3 oxen and 2 horses) × 19$\frac{19}{21}$ for 1 day,
= 58$\frac{18}{21}$ oxen and 39$\frac{18}{21}$ horses.
∴ 58$\frac{18}{21}$ oxen and 39$\frac{18}{21}$ horses eat as much as 42 oxen and 63 horses,
(58$\frac{18}{21}$ − 42) oxen eat as much as (63 − 39$\frac{18}{21}$) horses,
16$\frac{18}{21}$ " " " 23$\frac{18}{21}$ horses,
525 " " " 735 horses,
5 " " " 7 horses;
∴ appetite of ox : appetite of horse :: 7 : 5. Ans.

Note.—The solution of your first query appeared in our issue for May. See No. 9 of arithmetical queries.

6. DEVONIAN.—At what rate per cent. will £250 gain £20 8s. in 2 years at compound interest?

Interest on £1 for 2 years = £20·4 ÷ 250
= £·0816;
Amount of £1 " " = £1·0816.
$\sqrt{1{\cdot}0816}$ = 1·04.
∴ amount of £1 for 1 year = £1·04
" £100 " = £104
∴ Rate per cent = 4. Ans.

Note.—(1) When the given time is 3 years, 4 years, etc., the cube root, 4th root, etc., must be taken.

(2) If you refer to our issue for January you will find solution of question to find time at compound interest, as well as to find rate per cent.

7. RESOLVE.—Divide 13s. 1½d. into six parts, each succeeding part to be 6½d. more than the one preceding.

Second part = 6½d. more than first part,
Third " = 1s. 1d. " "
Fourth " = 1s. 7½d. " "
Fifth " = 2s. 2d. " "
Sixth " = 2s. 8½d. " "
∴ First part = {13s. 1½d. − (6½d. + 1s. 1d. + 1s. 7½d. + 2s. 2d. + 2s. 8½d.)} ÷ 6
= (13s. 1½d. − 8s. 1½d.) ÷ 6
= 5s. ÷ 6
= 10d.
∴ Parts = 10d., 1s. 4½d., 1s. 11d., 2s. 5½d., 3s., and 3s. 6½d.

8. W. G. J. C. B.—The first of a line of ten sentries, standing at equal distances from each other, wishes to send a message of twenty words to the last. The men begin to walk at the same instant and walk even distances right and left of their posts, alternately, and each time they meet pass on five words. The transmission of the message occupies 48 minutes, and the men walk at the rate of 3 miles per hour. How far is the first man from the last?

A sentry travels 8½ times his round while a message is transmitted along the whole line;
Between each message he travels twice a round;
∴ Distance travelled by a sentry while the twenty words are conveyed = 8½ + 2 + 2 + 2 = 14½ times a round;
∴ Distance between first and last sentries
= $\left(3 \times 8\frac{1}{2} \times \frac{9}{14\frac{1}{2}}\right)$ miles
= $\left(\frac{3 \times 1760 \times 4 \times 18}{5 \times 29}\right)$ yds.
= 2,621$\frac{19}{29}$ yds. Ans.

9. J. DAVEY.—A debt is to be discharged at the expiration of 4½ months, ½ is paid immediately, and ½ at the expiration of 3 months; when ought the remainder to be paid?

$(\frac{1}{2} \times \text{time}) + \{\frac{1}{2} \times (\text{time} - 3)\} = 4\frac{1}{2}$, where time is in months;
$\frac{1}{2}$ time + $\frac{1}{2}$ time − $\frac{3}{2}$ = 4½
$\frac{3}{2}$ time = 4½ + 1½
= 5½
∴ time = 5½ × ⅔
= 7 months. Ans.

Algebra.

1. FOLKESTONIAN.—Each of two bags contains 228 coins, sovereigns and shillings only; one contains as many sovereigns as the other shillings, and its contents are worth twice as much as those of the other; find the number of shillings in each. (*Certificate Examination.*)

Let x = no. of shillings in first bag,
Then $228 - x$ = " sovereigns in second bag;
∴ $x + 20(228 - x)$ = value of first bag in shillings,
And $20x + 228 - x$ = " second " "
∴ $x + 20(228 - x) = 2(20x + 228 - x)$
$x + 4560 - 20x = 2(19x + 228)$
$4560 - 19x = 38x + 456$
$-19x - 38x = 456 - 4560$
$-57x = -4104$
∴ $x = 72$.
∴ No. of shillings in first bag = 72
" " second " = 156 } Ans.

2. TARDUS.—A man inheriting money spends on the first day 19s., twice that sum on the next day, and 19s. additional every day till he exhausts his fortune by spending on the last day £190. What had he to start with?

This is a question in Arithmetical Progression, where a (first term) = 19, d (difference) = 19, l (last term) = 3,800, and s (sum) is required.

Let n = No. of terms,

Then, $l = a+(n-1)d$

$3{,}800 = 19+\{(n-1)\times 19\}$

$= 19+19n-19$

$19n = 3{,}800$

$\therefore\ n = \underline{200}$

$S = (a+l)\frac{n}{2}$

$= (19+3{,}800)\times\frac{200}{2}$

$= 3{,}819\times 100$

$= 381{,}900.$

$\therefore$ Sum = 381,900s. = $\underline{£19{,}095.}$ Ans.

3. FOLKESTONIAN.—Sum the following:—

$\sqrt{\frac{2}{5}} - \sqrt{6}+2\sqrt{15}$ – to 8 terms.

(*Hamblin Smith.*)

Here $a = \sqrt{\frac{2}{5}}$, $r = -\sqrt{10}$, $n = 8$.

$$S = \frac{a(r^n-1)}{r-1}$$

$$= \frac{\sqrt{\frac{2}{5}}\{(-\sqrt{10})^8-1\}}{-\sqrt{10}-1}$$

$$= \frac{\sqrt{\frac{2}{5}}(10{,}000-1)}{-\sqrt{10}-1}$$

$$= -\frac{9{,}999\sqrt{3}}{(\sqrt{10}+1)\cdot\sqrt{5}}.$$ Ans.

4. SILVIUS.—What is the price of oranges if, when I get two more for one shilling, they are one penny per dozen cheaper?

Let x = cost per dozen in pence,

then $\frac{144}{x}$ = no. obtained for a shilling,

and $\frac{144}{x-1}$ = " " " when one penny a dozen cheaper;

$$\therefore \frac{144}{x-1} - \frac{144}{x} = 2$$

$$\frac{72}{x-1} - \frac{72}{x} = 1$$

$$\frac{72}{x^2-x} = 1$$

$$x^2-x = 72$$

$$x^2-x+(\tfrac{1}{2})^2 = 72+\tfrac{1}{4}$$

$$= \frac{289}{4}$$

$$x-\tfrac{1}{2} = \pm\frac{17}{2}$$

$\therefore\ x = 9$ or -8.

$\therefore$ Price per dozen = $\underline{9d.}$ Ans.

5. F. S.—Having given

$a^2(b-c)x+b^2(c-a)y+c^2(a-b)z=0$,

and $(b-c)yz+(c-a)zx+(a-b)xy=0$,

prove that $ax=by=cz$.

(*Cambridge Local*, 1880, *Junior Algebra.*)

If $a^2(b-c)x+b^2(c-a)y+c^2(a-b)z=0$,

and $(b-c)yz+(c-a)xz+(a-b)xy=0$,

Then, (1) $a^2x = yz$

(2) $b^2y = xz$

(3) $c^2 = xy$

(1) × x: $a^2x^2 = xyz$

(2) × y: $b^2y^2 = xyz$

$\therefore\ a^2x^2 = b^2y^2$

$\therefore\ ax = by.$

(1 × x): $a^2x^2 = xyz$

(2 × z): $c^2z^2 = xyz$

$\therefore\ a^2x^2 = c^2z^2$

$\therefore\ ax = cz.$

$\therefore\ \underline{ax=by=cz.}$ Ans.

6. YRREB.—Some smugglers found a cave, which would just exactly hold the cargo of their boat, viz., 13 bales of silk and 33 casks of rum. While unloading, a revenue cutter came in sight, and they were obliged to sail away having landed only 9 casks and 5 bales, and filled $\frac{1}{3}$ of the cave. How many bales, or how many casks would it hold? (*Colenso.*)

Let x = space occupied by a bale of silk,

And y = " " cask of rum;

Then $13x+33y = 3(5x+9y)$

$= 15x+27y$

$15x-13x = 33y-27y$

$2x = 6y$

$\therefore\ x = 3y.$

$\therefore$ No. of bales = $13+\frac{3}{3}^2 = 13+11 = 24$,

And " casks = $\underline{24\times 3 = 72}$

7. DESIROUS.—Solve:—

(1) $x^2+2xy-y^2 = a^2+2a-1$

(2) $(a-1)x(x+y) = a(a+1)y(x-y)$

(2) $(a-1)x(x+y) = a(a+1)y(x-y)$

$$\frac{x(x+y)}{y(x-y)} = \frac{a(a+1)}{a-1}$$

$$\frac{x^2+xy}{xy-y^2} = \frac{a^2+a}{a-1}$$

Adding and subtracting numerator and denominator—

$$\frac{x^2+2xy-y^2}{x^2+y^2} = \frac{a^2+2a-1}{a^2+1}$$

$\therefore\ \underline{x^2+y^2 = a^2+1.}$

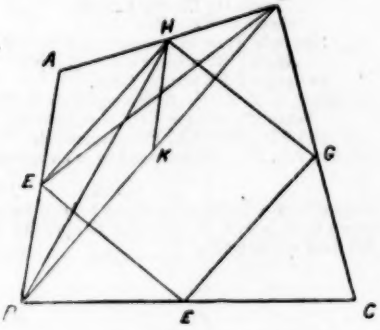
It is evident that the values, $x^2=a^2$, $y^2=1$ satisfy this equation.

$\therefore\ \underline{x=\pm a,\ y=\pm 1.}$

Note.—Area of Egypt is 176,000 square miles.

Geometry.

1. MOONRAKER.—Prove that the quadrilateral formed by joining the middle points of the sides of any quadrilateral is a parallelogram; and that its area is half that of the given quadrilateral. (June Matric. 1882, London University.)



Let ABCD be a quadrilateral, and let E, F, G, H be the middle points of the sides.

Then the quadrilateral EFGH is a parallelogram, and it is half of the quadrilateral ABCD.

Join BD, ED, HB.

Proof.—Because AE = EB, (Hyp.)

$\therefore$ triangle AHE = triangle EHB; (I. 38.)

and because AH = HD,

$\therefore$ triangle AEH = triangle HED;

Wherefore triangle EHB = triangle HED; (Ax. 1.) and these triangles are upon the same base EH and upon the same side of it;

$\therefore$ EH is parallel to BD. (I. 39.)

Similarly it can be proved that FG is parallel to BD;

$\therefore$ EH is parallel to FG. (I. 30.)

In the same manner it can be demonstrated that EF, HG are parallel.

Hence the quadrilateral EFGH is a parallelogram. (Def. A.)

Again, join H with K, the middle point of BD.

Then HK is parallel to EB, and EBKH is a parallelogram.

Triangle AEH = triangle HKD, (I. 26.)

and triangle HKD = half of the parallelogram EBKH;

∴ triangle AEH = one-fourth of the triangle ABD.

Similarly it can be proved that triangle CFG = one-fourth of the triangle BCD.

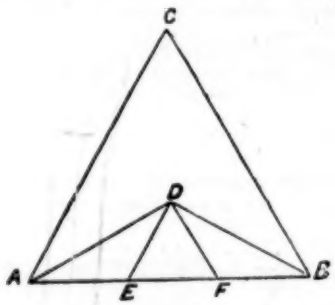
Therefore triangles AEH, CFG together equal one-fourth of the quadrilateral ABCD.

In the same manner it can be demonstrated that the triangles BEF, DGH together equal one-fourth of the quadrilateral ABCD.

Therefore the four triangles AEH, BEF, CFG, DGH together equal one-half of the quadrilateral ABCD.

Wherefore the parallelogram EFGH is half the quadrilateral ABCD. Q. E. D.

2. ORGETORIX.—Trisect a given finite straight line.



Let AB be the given straight line.

Construction.—Upon AB describe an equilateral triangle ABC; (I. 1.)

Bisect the angles at A and B by the straight lines AD, BD, meeting in D; (I. 9.)

Through D draw DE parallel to AC, and DF parallel to BC. (I. 31.)

Then AB shall be trisected in the points E, F.

Proof.—Because AC is parallel to DE,

∴ alternate angles CAD, ADE are equal; (I. 29.)

but angle DAE = angle CAD; (con.)

∴ angle DAE = angle ADE,

wherefore ED = EA. (I. 6.)

Similarly it can be proved that FD = FB.

Angle DEF = angle CAB, (I. 29.)

and angle DFE = angle CBA,

∴ remaining angle EDF = remaining angle ACB; (I. 32.)

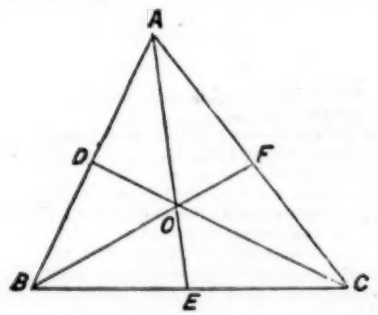
hence the triangle EDF is equilateral,

and ED, FD = EA, FB, respectively,

∴ AE, EF, FB are equal to one another.

Q. E. F.

3. DEDUCTION.—If the sides of any triangle be bisected, and lines drawn from points of bisection to opposite angles, these lines will meet in one point.



Let ABC be a triangle, and let D, E, F be the points of bisection of the sides; draw BF, CD, intersecting in O, and join AO, EO.

Then AOE shall be a straight line.

Proof.—Because AD = DB, (Hyp.)

∴ triangle ADC = triangle BDC (I. 38);

wherefore triangle BDC is half the triangle ABC.

Similarly it can be proved that triangle CBF is half the triangle ABC;

∴ triangle BDC = triangle CBF; (Ax. 7.)

take from these equals the triangles BOC,

∴ triangle DOB = triangle FOC; (Ax. 3.)

Triangle AOD = triangle DOB, and triangle AOF = triangle FOC; (I. 38.)

∴ triangle AOD = triangle AOF;

and triangle BOE = triangle COE; (I. 38.)

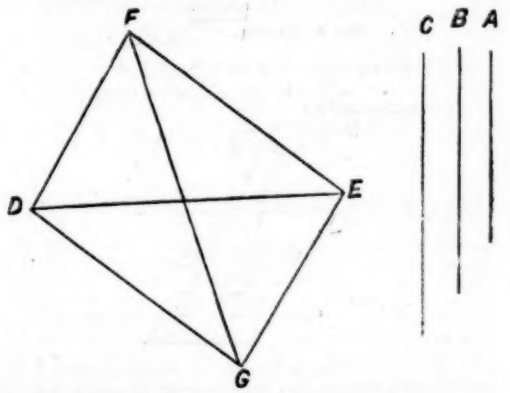
∴ the three triangles AOD, DOB, BOE = the three triangles AOF, FOC, COE; (Ax. 2.)

Wherefore the line AOE bisects the triangle ABC; but the straight line drawn from A to E bisects the triangle ABC;

∴ AOE is a straight line.

Wherefore the three straight lines AE, BF, CD intersect in one point. Q. E. D.

4. W. J. P.—Given two contiguous sides, and a diagonal of a parallelogram, show how to find the other diagonal. (P. T.'s Examination, *January*, 1880.)



Let A, B be the lengths of the contiguous sides, and C the length of the given diagonal.

Construction.—Take DE = C;

From D with radius = A, and from E with radius = B, draw arcs intersecting in F;

From E with radius = A, and from D with radius = B, draw arcs intersecting in G;

Join FG; then FG shall be the other diagonal of the parallelogram.

Draw EF, EG.

Proof.—In the triangles DFE, EGD,

The two sides DE, EF = the two sides ED, DG, each to each,

and the base DF = the base EG,

∴ angle DEF = angle EDG; (I. 8.)

Wherefore EF is parallel to DG; (I. 27.)

Similarly it can be proved that DF is parallel to EG; or it can be proved by (I. 33);

∴ DGEF is a parallelogram; (Def. A.)

and consequently FG is the other diagonal.

Q. E. F.

ANSWERS TO ARITHMETICAL QUESTIONS IN 'THE SCHOLAR,' FOR OCTOBER, 1882.

EXERCISE XII.

(1) $\frac{m}{n}$; $\frac{pq}{rs}$; $\frac{x}{y}$. (2) $\frac{abc}{def}$; $\frac{pqr}{xyz}$. (3) x^4; a^3; a^2b. (4) a^2b; mn^3. (5) 1; 1; 1. (6) $12abc$; $-9x^2y$. (7) $6003ab^2c$. (8) $112ac^2$. (9) $\frac{x}{y}$ pounds. (10) 60.

EXERCISE XIII.

(1) $x+y+z$. (2) $b-4a+6ab$. (3) $-ax+5a^2-2ax^2+3$. (4) $\frac{1}{4}a^2-\frac{3}{4}ax+\frac{1}{4}x^2-\frac{1}{4}ax^2$. (5) $12a^2y^3-5xy^2z+6y^2z^3$. (6) $1:-3$. (7) $a+b$. (8) $a-b$. (9) x^2-3xy. (10) $3x-4y$. (11) $3x-2y$. (12) $x+5$. (13) $a^2-8a-20$. (14) $8x^3+12x^2y+18xy^2+27y^3$. (15) $a^4+2a^3+3a^2+4a+5$. (16) $1+5x+15x^2+45x^3+$ etc.

ANSWERS TO ALGEBRA QUESTIONS IN 'THE SCHOLAR,' FOR OCTOBER, 1882.

STANDARD III.

A. 1. 4808—7.
2. 19,545—34.
3. 293—49.

B. 1. 51,312—57.
2. £39 2s. 9½d.
3. 23,729 pence.

C. 1. £9160 1s. 10½d.
2. 831—359.
3. £599 19s. 8⅔d.

D. 1. 56—841.
2. £643 11s. 6⅔d.
3. 2826 stamps.

E. 1. £1 13s. 4d.
2. 75—5190.
3. £10,220 12s. 3d.

F. 1. £816 2s. 11⅔d.
2. £5 8s. 8⅓d. less.
3. 485 ducks.

ADVANCED EXAMINATION.

1. 60 miles.
2. £8 15s.
3. £5607½ 13s. 8⅔d

STANDARD IV.

A. 1. £811 2s. 0⅔d.
2. £7171 13s. 10½d.
3. £882 13s. 8⅔d.—6.

B. 1. £850 4s. 7⅔d.
2. 166,656 oz.
3. £5922 10s. 0⅔d.

C. 1. £3 3s. 9⅔d.—137.
2. 60 shirts, & 1yd. 1qr. left.
3. 141 lb. 11 oz. 8 dwt. 3 gr.

D. 1. 132 boys.
2. £1 13s. 6½d.
3. 5⅔d.—2491.

E. 1. £18 15s. 9d.
2. £55 6s. 3d.
3. 198 yd. 3 qr. 2 nl. 1½ in.

F. 1. 54,722½ sq. ft.
2. 1080 eggs.
3. 20,939,520 oz.

ADVANCED EXAMINATION.

1. £785 8s. 4d.
2. 2½ days.
3. 11¼ lb. each horse.

STANDARD V.

A. 1. £44 5s. 7½d.
2. £172 3s. 7½d.
3. £257 3s. 2⅔d.

B. 1. £3 18s. 5¼d.
2. £732 14s. 0½d.
3. £2 3s. 9d.

C. 1. £3097 0s. 1⅔d.
2. £73 0s. 0¼d.
3. £19 5s. 6½d.

D. 1. £60,282 4s. 2d.
2. £18 17s. 9⅔d.
3. 114 balls.

E. 1. £465 12s. 6d.
2. £113 6s. 10½d.
3. £26 14s. 11d.

F. 1. £43 17s. 6d.
2. £10 4s. 9d.
3. £53,840 13s. 0⅔d.

ADVANCED EXAMINATION.

1. £19 11s. 7½d.
2. 24 yards.
3. £206 9s. 2d. gain

STANDARD VI.

A. 1. 1⅓.
2. ⅓.
3. 7⅔.

B. 1. 12·29.
2. ·05148.
3. ·00109375.

C. 1. 19s. 3d.
2. £2 3s. 9⅔d.
3. ⅓.

D. 1. 2⅔.
2. £·8260869+
3. 18 days.

E. 1. ⅞.
2. 5⅓d.
3. 44 to 43.

F. 1. £1327 1s. 8d.
2. ⅔.
3. 12s. 10⅔d.

ADVANCED EXAMINATION

1. 64 to 25.
2. £15 11s.
3. 1·5779+lb.

STANDARD VII.

A. 1. £15.
2. £101 12s. 6d.
3. 6¼ per cent.

B. 1. £845 4s. 4½d.
2. 15s. 3d.
3. 3⅓ per cent.

C. 1. £8116 17s. 6d.
2. 6⅔ per cent.
3. 2⅓ years.

D. 1. £739 2s. 7⅔d.
2. 2½ per cent.
3. £4 9s. 7½d. loss.

E. 1. 41⅔ per cent.
2. £1 4s. 6⅓d. a cwt.
3. £127 7s. 10·5408d.

F. 1. £204 10s. 10⅓d.
2. 14⅔ p.c. additional.
3. £79 14s. 8⅔d. P. W.

ADVANCED EXAMINATION.

1. £20 14s. 3⅔d. increase.
2. £35 16s each horse.
3. 5⅔ months.

SOLUTIONS OF THE 'ADVANCED EXAMINATION' QUESTIONS IN 'THE SCHOLAR,' FOR OCTOBER, 1882.

STANDARD III.

1. ½d. × 200 = 50d. cost of scholars for *one* mile.
½d. × 60 = 30d. ,, adults ,, ,,
£20 or 4800d. ÷ 80d. = 60 miles. Ans

2. 3s. 6d. × 3½ = 12s. 3d. value of a turkey, but it is also the value of a goose and a hare. Then 12s. 3d. − 3s. 6d. = 8s. 9d. value of a goose, and 8s. 9d. × 20 = £8 15s. Ans.

3.

	£	s.	d.
80,049 g. =	84,051	9	0
75,306,013 l. =	78,443	15	3½
	£5607	13	8½

Ans.

STANDARD IV.

1. 8000 at 9½d. = 76,000d. cost of excavating.
8000 c. y. = 5000 ton at 12½d. = 112,500d. ,, carting.
Total 188,500d. = £785 8s. 4d. Ans.

2. 4s. 9d. × 20 = £4 15s. wages for the full time.
£4 15s. − £4 3s. 1½d. = 11s. 10½d. wages lost.
11s. 10½d. ÷ 4s. 9d. = 2½ days. Ans.

3. 12 ton 14 cwt. 2 qr. 26 lb. = 28,530 lb.
13½ lb. × 118 × 10 = 15,930 ,, eaten by cows.
12,600 ,, ,, ,, 112 horses in 10 days.
12,600 lb. ÷ (112 × 10) = 11¼ lb. Ans.

STANDARD V.

1. 14¼ at 4s. 9d. = £3 7s. 8¼d., 243½ at 5½d. = £5 11s. 7¼d., 7⅞ at 16s. 9d. = £6 9s. 9¾d., 48½ at 1s. 4½d. = £3 6s. 8¼d., 2⅛ at 5s. 6d. = 15s. 9¾d. ; = total £19 11s. 7¼d. Ans.

2. A does (4 + 8 =) 12 yds. more than C, and B does 8 yds. more than C, hence they together do 20 yds. in excess of each doing as much as C.
Then (92 − 20 =) 72 ÷ 3 = 24 yds. Ans.

3.

	£	s.	d.	
3,600,000 = 25,000 gross, at 4½d. =	442	14	2	selling price.
3,600,000 = 3,600 thousand at 1s. 3⅔d. =	236	5	0	cost ,,
Ans.	£206	9	2	gain.

STANDARD VI.

1. Taking the unit of work to be a ton drawn a mile, we have, (160 ton × 3 =) 480 ÷ (8 × 4 × 10 =) 320 = 1½ of the above units each horse per hour. Again, (180 ton × 5 =) 900 ÷ (12 × 16 × 8 =) 1536 = 1⅞⅝ frac. of the above unit each donkey per hour. Hence the ratio is 1½ to 1⅞⅝ = 192 to 75 = 64 to 25. Ans.

2. 1 − ⅝ = ⅜ the remainder, and ⅜ of ⅜ = ¼ of the whole ; hence £3 17s. 9d. × 4 = £15 11s. Ans.

3. ·88 × 1·15 = 1·012 lb. of bread from 1 lb. of wheat.
3·55 × 2240 × 1·012 = 8047·424 bread consumed.
8047·424 ÷ (850 × 6 =) 5100 = 1·5779+lb. Ans.

STANDARD VII.

1. £2450 10s. ÷ 84½ = 29 cents. of 4 per cent. stock bought.
£4 × 29 = £116 income arising for 4 per cent. stock.
£88 × 29 = 2552 received on selling out.
£2552 ÷ 70 = 36⅓⅞ cents. of railway stock bought.
£3½ × 36⅓⅞ = £136⅞ income from railway stock.
£136⅞ − £116 = £20⅞ = £20 14s. 3⅔d. increase. Ans.

2. 2000 g. = £2100, 30 per cent. on which = £630 : hence the whole must be sold for £2730.
(£35 × 25 =) £875 + (£32 × 30 =) £960 = £1835 received for 55 horses. Then £2730 − £1835 = £895 selling price of remaining 25 ; and £895 ÷ 25 = £35 16s. each. Ans.

3. £85 − £83 7s. 6d. = £1 12s. 6d. discount allowed ; it is also the interest that £83 7s. 6d. at 4 per cent. would make in the given time. A *year's* interest on £83 7s. 6d. at 4 per cent. = £3 6s. 8⅓d., and £1 12s. 6d. is ⅓⅛⅛ of this year's interest = 5⅞⅛ months. Ans.

The question may be thus more simply presented, and then worked by proportion :—If £100 makes £4 interest in 12 months, in what time would £83 7s. 6d. make £1 12s. 6d. ?

Gossip.

The *Century* for August has an interesting paper on 'The Borderlands of Surrey,' the scenery of which George Eliot said pleased her more than any she knew of in England An illustration is given of Brookbank, the old two-storied cottage in which the great novelist lived whilst she was writing 'Middlemarch.' Ten minutes' walk from this quaint home there is a picturesque old farmhouse, and we are told that 'George Eliot would often visit the farmer's wife, and sitting on a grassy bank just beside the kitchen door, would discuss the growth of fruit and the quality of butter in a manner so quiet and simple, that the good country people were astonished, expecting very different conversation from the great novelist.' Tennyson's house is three miles from Shotter Mill, and the thoughtless, ill-bred curiosity of tourists is a great annoyance to the poet. Mr. Cosmo Monkhouse contributes an article to this magazine on 'Some English Artists and their Studios,' and the studios illustrated are those of Leighton, Millais, Pettie, Prinsep, Boughton, P. R. Morris, Linton, and Alma-Tadema.

***

It is stated that the authorised life of Longfellow will be written by his brother, the Rev. Samuel Longfellow, who has resigned his pastoral charge in Germantown, Pennsylvania, and has come to live with the poet's daughters in the house at Cambridge.

***

M. Renan will publish a translation of the Psalms on his return from the East.

The £5 prizes given by the Syndicate to the five women highest in the list who are preparing for the profession of teaching, have been awarded to Miss Benson, Hertford (Cambridge Centre); Miss Marr, Clapham Middle School (London Centre); Miss Hewett, Launceston (Plymouth Centre); Miss Willoughby, High School, Plymouth (Plymouth Centre) Prizes of £2 10s. each, under the same conditions, were given to Miss Bennett, Birmingham (Birmingham Centre); Miss C. Frost, Cambridge (Cambridge Centre); and Miss F. R. Gray, Roscrea, Ireland (Cambridge Centre). The Lowman Memorial Prize was awarded to Miss Willoughby, High School, Plymouth (Plymouth Centre); and the prize for Italian to Miss Garnett, Welwyn, Herts (London Centre).

***

The American Spelling Reform Association, at its sixth annual meeting, recently held at Harvard University, has established a league of persons pledged to use simplified spelling beginning with such amended words as are found in Worcester's and other dictionaries—*program*, *iland*, *sovran*, *rince*, *ake*. Professor D. W. Whitney, of Yale, was the first signer of the league, and Professor Scott, of Columbia, has been commissioned to draw up a list of such simplified spelling.

***

Professor Knight's 'Wordsworth' (Edinburgh: W. Paterson) is a most valuable edition of the poet's works. The poems are arranged chronologically, the latest text is given, and there are valuable notes on places, persons, and textual readings.

Books for Prizes & Libraries.

TACT, PUSH, and PRINCIPLE. A Book for those who wish to Succeed in Life. By W. M. THAYER, Author of 'The Pioneer Boy,' 'From Log Cabin to White House,' etc. s. d.
Just Published 3 6
'An admirable and interesting volume.'—*Rock.*

PRESIDENT LINCOLN.—The PIONEER BOY, and HOW HE BECAME PRESIDENT: The Story of the Life of Abraham Lincoln. By W. M. THAYER. Steel Portrait.
Sixth Thousand 5 0
'A very fascinating story.'—*Pictorial World.*

PRESIDENT GARFIELD.—From LOG CABIN to WHITE HOUSE: The Story of the Life of President Garfield. By W. M. THAYER. With Portrait 5 0
CHEAP EDITION. Fifty-third Thousand 1 6
'Brings out very strikingly the great character of the man.'—*Guardian.*

ALL TRUE. Records of Peril and Adventure, Missionary Enterprises and Travels, Wonders of Nature and Providence, Incidents of Christian History and Biography. By Dr. MACAULAY, Editor of the *Leisure Hour*. Numerous Illustrations 5 0

ENTERING on LIFE. By CUNNINGHAM GEIKIE, D.D., Author of 'The Life and Words of Christ,' etc. A Book for Young Men 3 6
'We earnestly recommend young men to read what has been to ourselves a truly delightful work.'—*Dean Alford.*

THE JUNIOR CLERK. A Tale of City Life. By EDWIN HODDER. Twelfth Edition 2 6

TOSSED on the WAVES. By the same Author. Frontispiece 3 6
'Just the sort of story that boys delight to read.'—*Athenæum.*

HENDRICKS the HUNTER; or, the Border Farm. A Tale of Zululand. By W. H. G. KINGSTON. Five Illustrations. Fourth Thousand 5 0

PETER TRAWL; or, the Adventures of a Whaler. By W. H. G. KINGSTON. With Eight Full-page Illustrations 5 0

*** Illustrated Catalogue of Books for Prizes sent post free.

Educational Works.

Seventh Edition, with additions and corrections.

THE STORY of the EARTH and MAN. By J. W. DAWSON, LL.D., F.R.S., F.G.S. Twenty Illustrations. Crown 8vo, 7s. 6d.

CÆSAR.—A COMPLETE DICTIONARY to CÆSAR'S GALLIC WAR. With an Appendix of Idioms and Hints on Translation. By ALBERT CREAK, M.A. Fourth Edition. 2s. 6d., cloth.

105th Thousand.

BELL'S STANDARD ELOCUTIONIST. Principles and Exercises, with a copious Selection of Extracts adapted for Reading and Recitation. By D. C. BELL and A. MELVILLE BELL, F.E.I.S. Roxburghe binding, pp. 510, with frontispiece. 3s. 6d.

WRIGHT AND GUY'S STANDARD EDITION OF

MANGNALL'S HISTORICAL and MISCELLANEOUS QUESTIONS: British and General Biography, etc. With numerous Illustrations by Sir John Gilbert, etc. 12mo, half-bound. 4s. 6d.

LE PETIT PRECEPTEUR; or, First Steps to French Conversation. By F. GRANDINEAU, formerly French Master to Her Majesty the Queen. Fifty Woodcuts. Fifty-first Edition. 1s. 6d. cloth.

LE PETIT GRAMMAIRIEN; or, the Young Beginner's First Steps to French Reading. A Sequel to 'Le Petit Precepteur.' By T. PAGLIARDINI, Head French Master of St. Paul's School, London. Fifth Edition. 3s., cloth.

DER KLEINE LEHRER; or, First Steps to German Conversation. On the plan of 'Le Petit Precepteur.' Sixth and Cheaper Edition. 2s., cloth.
'An exceedingly simple and attractive little guide to German.'—*School and University Magazine.*

FIRST LESSONS in GEOGRAPHY. In Question and Answer. 333rd Thousand. 1s.

FIRST LESSONS in the HISTORY of ENGLAND. In Question and Answer. Twenty-third Edition. 1s.
'By far the best little book on English History we have seen for children.'—*School Board Chronicle.*

FIRST LESSONS in ASTRONOMY. In Question and Answer. Ninth Edition, revised. 1s.

London: HODDER AND STOUGHTON, 27, Paternoster Row.

BRITISH MUSEUM 27SE82

MAGNETINE (DARLOW & CO.'S).

Recommended and used for the Cure of

Spinal Affections	Rheumatism	General Debility	Sciatica	Asthma
Liver Complaints	Rheumatic Gout	Constipation	Lumbago	Neuralgia
Heart Affections	Lung Affections	Hysteria	Hernia	Bronchitis

And other kindred complaints.

TESTIMONIALS.

76, Wimpole Street, Cavendish Square, London, W.

SIR,—I am able to certify that I have used your Magnetine Appliances pretty largely in my practice, and that in personal convenience to my patients they are unexceptionable, and far superior to any other inventions of the kind which I have employed; and that of their efficacy, their positive powers, I have no doubt. I have found them useful in constipation, in abdominal congestion, in neuralgia, and in many cases involving weakness of the spine and of the great organs of the abdomen. In the public interest, I wish you to use my unqualified testimony in favour of your Magnetic Appliances.—I remain, yours faithfully,

GARTH WILKINSON, M.D., M.R.C.S.E.

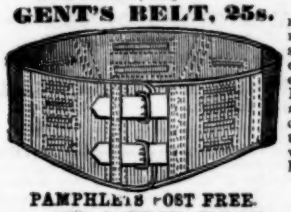
F. W. DARLOW, Esq.

Horton Infirmary, Banbury, Oxfordshire, July 28th, 1882.

DEAR SIR,—I think you will be pleased to learn that in a comparatively short time after wearing your appliances, the pain in the top of my lungs went away, and *has never returned*; also a troublesome, long-standing itching eruption on the back and shoulders disappeared entirely; and I believe these 'good losses,' to speak paradoxically, arose entirely from the use of your Magnetine. Again, the wearing of your Belt, a short time after putting it on, after breakfast, gives relief—*marked relief*—to a pain in the left side, which has tormented me more or less for many years; of this I can speak most confidently and unmistakably. In conclusion, upon the whole, all through the winter, whilst wearing your Magnetic Soles, I have suffered less with cold feet than heretofore. With kind regards, I remain, dear sir, yours truly,

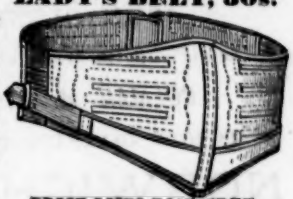
GEORGE WARE DAVIDS,
The Resident Dispenser, Horton Infirmary, Banbury.

GENT'S BELT, 25s.



PAMPHLETS POST FREE.

LADY'S BELT, 30s.



PRICE LISTS POST FREE.

DARLOW & CO., 443, STRAND, LONDON.

DR. HOPKINS'S EDUCATIONAL WORKS.

HOPKINS'S EXERCISES IN ORTHOGRAPHY, on an improved plan, and containing much valuable information on various subjects. New Edition, 1s. 6d.

HOPKINS'S EXERCISES IN COMPOSITION. New Edition, 1s. 6d. A KEY TO THE ABOVE, 1s. 6d.

HOPKINS'S PUPIL'S MANUAL OF EXERCISES IN MENTAL ARITHMETIC, containing 25,000 Questions, with the Rules for their Calculation, 2s.

HOPKINS'S TEACHERS' MANUAL OF EXERCISES IN MENTAL ARITHMETIC, forming a Key to the above 3s. 6d.

London: Simpkin, Marshall & Co.; Longman & Co.; Kent & Co.; Relfe Brothers; Hamilton, Adams, & Co. Birmingham: E. C. Osborne. Manchester: Heywood.

Gill's Class Subject and Reading Books.

THE DEPARTMENT.

In the Instructions to Inspectors, just issued, the Committee of Council has clearly stated that a Series of Historical Readers will be required as a SECOND SET, and a Series of Geographical or Scientific Readers as a THIRD SET, in Standard III. and upwards.

GILL'S HISTORICAL READERS.

These are the only complete Series of Historical Readers yet published that have been entirely written, illustrated, and graduated to suit the Code 1882, which has now to be provided for. It is the universal opinion of all critics that they are the best specimens of book-work ever prepared for Elementary Schools. The COMPOSITION is interesting, the ILLUSTRATIONS are works of art, the BINDING is practically untearable, the PAPER is of the best quality.

No. I. STORIES FROM ENGLISH HISTORY (Standard III.), 10d.
No. II. EARLY ENGLAND, to 1154 (Standard IV.), 1s.
No. III. MIDDLE ENGLAND, 1154-1688 (Standard V.), 1s. 4d.
No. IV. MODERN ENGLAND, 1688-1882 (Standard VI.), 1s. 6d.

GILL'S WHITEHALL GEOGRAPHICAL READERS.

These have been re-arranged and re-written where necessary to exactly suit the requirements of the Code 1882, in Political and Physical Geography, and are now ready. They are cheap, and beautifully Illustrated with Maps and Pictures.

WHITEHALL GEOGRAPHICAL READER (Standard II.), 7d.
WHITEHALL GEOGRAPHICAL READER (Standard III.), 10d.
WHITEHALL GEOGRAPHICAL READER (Standard IV.), 1s.
WHITEHALL GEOGRAPHICAL READER (Standard V.), 1s. 4d.
WHITEHALL GEOGRAPHICAL READER (Standard VI.), 1s. 9d.

GILL'S DESCRIPTIVE & PICTORIAL GEOGRAPHICAL READERS.

These Popular Readers nearly coincide with the requirements of the Code 1882, and may still be used as Class Reading Books in Geography. *See Instructions to Inspectors.*

No. I., 9d.; No. II., 1s.; No. III., 1s. 4d.; No. IV., 1s. 6d.; No. V., 2s.

GILL'S IMPERIAL ARITHMETIC.

PRACTICAL and MENTAL, exactly suit the Code 1882. 2d. each Standard; Standard VI., 3d.

SAMPLES HALF PRICE.

GEORGE GILL & Co., 23, Warwick Lane, London

Just Published,

In fcp. 8vo, price 3s. 6d. cloth.

Art-Instruction in England.

By F. E. HULME, F.L.S., F.S.A.,

Author of

'Worked Examination Questions in Plane Geometrical Drawing,' etc.

LONDON: LONGMANS & CO.

APPROVED EDUCATIONAL WORKS.

BY J. C. CURTIS, B.A.,

Principal of the Training College, Borough Road, London.

*** Mr. Curtis will supply Principals of Schools with Specimen Copies at half the price in stamps.

The Poetical Reader. 120th Thousand. Price 1s.
'Just such a selection of spirited, genuine, and accredited ballads and pieces as we should wish our children to have at their tongues' end.'—*Patriot.*

The New Poetical Reader. 24th Thousand. Price 1s.
'It is sure to be a favourite wherever introduced.'—*National Schoolmaster.*

The Complete Poetical Reader. Being the Poetical Reader and the New Poetical Reader in one volume. Price 2s.

An English Grammar for Schools. With Copious Exercises, Examples of Parsing, Analysis, etc. 16th Thousand. Price 1s.
'Clear, sound, and compact.'—*School Board Chronicle.*

A First Book of Grammar and Analysis. With Copious Exercises and Questions for Examination. 42nd Thousand. Price 3d.
'A handy and thoroughly well got-up little manual.'—*Scholastic Register.*

Outlines of English Grammar. With Copious Exercises. 205th Thousand. Price 6d.
'Remarkably clear in its definitions, copious in its facts, and rich in the examples it gives for exercise.'—*Freeman.*

A Manual of Grammatical Analysis. With Copious Exercises for Analysis and Composition. 63rd Thousand. Price 6d.
'A very clear and excellent manual.'—*School Board Chronicle.*

A Manual of Etymology. 17th Thousand. Price 6d.
'Ably executed. The notes are especially valuable.'—*Educational Review.*

Outlines of Geography. 139th Thousand. Price 6d.
'A most excellent little manual.'—*Court Circular.*

A First Book of Geography, with Questions for Examination. 11th Thousand. Price 3d.
'The amount of information is really wonderful.'—*National Schoolmaster.*

The Geography of Great Britain and Ireland. 131th Thousand. Price 6d.

A School and College History of England, containing Copious Supplementary Chapters. 23th Thousand. Price 5s. 6d.
'A most admirable general narrative is given of political events.'—*Civil Service Gazette.*

A Short Manual of English History. 10th Thousand. Price 6d.
'Comprehensive and well arranged.'—*Educational Record.*

Outlines of English History. 227th Thousand. Price 6d.
'We know of none equal to it.'—*Journal of Education.*

Outlines of Scripture History. 32th Thousand. Price 6d.
'Concise, comprehensive, and well arranged.'—*Church and School Gazette*

LONDON: SIMPKIN, MARSHALL, & CO.

'BANKRUPT STOCK.'

G. E. HAWES,

SCHOOL DESK MANUFACTURER,

Having purchased the Entire Stock of Iron Standards manufactured by

JOHN GLENDENNING,

Late of Chalk Hill Works, trading under the name of

COLMAN & GLENDENNING,

IS NOW OFFERING THE CELEBRATED

NORWICH DESKS

AT GREATLY REDUCED PRICES.

For particulars apply to the above, at

CHAPEL FIELD

OR

DUKE'S PALACE WORKS,

NORWICH.

Maker to the Birmingham School Board.

ADAIR'S

E XCELSIOR COPY-BOOK

Are acknowledged to be the most beautiful style of Writing of any Copy-books yet Published.

Fcap. 4to, 16 pp.	. . .	1d. each.
,, 24 pp.	. . .	2d. ,,

The Series consists of ten Books, carefully graduated on the most skilful principle to facilitate the easy progress of the Pupils.

1. Introductory — Letters — Easy Words, without Long Letters. Double Line.
2. Easy Words, with Long Letters. Double Line.
3. Easy Words and Long Letters. Double Line.
4. Capitals—Words with Capitals—Figures. Double Line.
5. Short Sentences, With Capitals Double Line.
6. Small Hand—Sentences. Double Line.
7. Small Hand—Sentences.
8. General Finishing Hand.
9. Commercial Finishing Hand.

A. Invoice and Account Forms.

The Writing is natural, elegant, and free—the fac-similes of the writing of a Teacher who has made the teaching of writing a special study for upwards of thirty-six years, and is acknowledged by H.M.I. as one of the most successful writing masters of the day.

'The writer and engraver put their whole trust in the graceful, attractive, clear, and easy style of caligraphy. It is certainly an exceedingly desirable style for school children to acquire, and it has the merit of being really adapted to pen-and-ink work, and not merely a good piece of engraving to look at.'—*The School Board Chronicle, London.*

'This series of copy-books extends from Letters to "Commercial Finishing Hand." It is skilfully graduated, and presents the very best models of writing. The combinations of letters given for imitation in the earlier numbers are specially fitted to train both the eye and the hand to the niceties of correct penmanship; and pupils carefully drilled to the faithful copying of the various head-lines must in time acquire a very good style of writing. We can highly recommend the series to teachers in search of copy-books.'—*The Educational News.*

Teachers anxious to produce graceful and free Penmanship in their Schools should send for Specimen Copies and give them a trial.

London: GEORGE GILL & SONS, 23, Warwick Lane, Paternoster Row.
Liverpool: THE NORTH-WESTERN EDUCATIONAL TRADING CO., Limited, 44a, Renshaw Street.
Manchester: THE MANCHESTER AND DISTRICT SCHOLASTIC TRADING COMPANY, 43, Deansgate.
Belfast: HUGH ADAIR, Publisher.

WORLD SCHOOL SERIES.

ARITHMETICAL TEST CARDS. 36 different Cards in Packet. Answers on parchment. Standards I. to VI. 1s. each. Palatine, Hickey's, Combination, Leopold, Introductory, Mechanical, Ledsham's, Greenwood.

ARITHMETICAL EXAMINATION QUESTIONS in Book Form. Series A, B, C, D. Standards I. to VI. each series; ½d. each Standard. Answers, Card or vellum, ½d. each. More than 1,000,000 have been sold.

LEDSHAM'S SHORT STORIES CARDS. 36 different Stories, with Paraphrase Spelling and Caution Notes on back of each Card. 1s. per Packet.

LEDSHAM'S ESSAY and LETTER CARDS. 24 different subjects. 1s. per Packet.

From *Practical Teacher*:—'It is with sincere pleasure we introduce this modest-looking packet of twenty-four Cards (each different) to the notice of our readers. Every card contains either a "model" essay or letter, couched in simple language, and designed for copying, dictation, or analysis. Many of the subjects dealt with have actually been proposed by Her Majesty's Inspectors of Schools. These cards meet a long-felt want, and their introduction into any school must be followed with most satisfactory results.'

Specimen Copies sent upon application to Publisher, 31, Corporation Street, Manchester.

JAMES B. LEDSHAM, Manchester.

London: SIMPKIN, MARSHALL, & Co. Leeds: ARNOLD. Glasgow: HOLMES. Sheffield: WALKER.

And all the Educational Companies.

Tuition by Correspondence.

SCHOLARSHIP.—Graduated instruction is provided regularly twice a week; suitable exercises are set and corrected; every difficulty is carefully solved; and all deficiencies are fully supplied. The terms are either 10s. per Quarter, or Payment by Results.

SPECIMEN SOLUTIONS to the Scholarship Questions, July, 1882, Part I. contains the Arithmetic for Male and Female Candidates; Part II. contains the Algebra, Euclid (deductions), and Mensuration. The price of each part is 7d., or half price to present and former pupils.

MATRICULATION (established 1871).—Certificate, Civil Service, A.C.P., Diocesan, Science, Drawing, Shorthand, P. T. Papers, Musical, Medical, Legal, and all other branches as advertised. No payment unless successful.

Address, MR. JAMES JENNINGS, Tuition by Correspondence Office, Deptford, London.

COX & CO.,

99 & 101,

NEW

OXFORD

STREET,

LONDON.

SCHOOL NEEDLEWORK MATERIALS.

A SPECIAL PRICE LIST,

Showing a saving in the cost of the above goods, is sent Post Free to

SCHOOL BOARDS, MANAGERS, AND TEACHERS.

It includes School Calicoes, Flannels, Prints, Hollands, Canvases, Paper Patterns, Knitting Cottons, Knitting Wools, Cottons, Needles, Tapes, Buttons, Marking Specimens for letters, Swiss Darning, Grafting, Plain and Bird's-eye Darning, Stocking Web, and all Sewing Requisites needed under the Third Schedule.

Six Specimens of Darning, post free, ONE SHILLING.

Thirteen Specimens of Stitches, post free, EIGHTEENPENCE.

Lined Paper for the 'Governess' Patterns, 1s. 6d. per doz. Sheets.

CARRIAGE FREE. SEE CATALOGUE.

Just Published. Very fully Illustrated.

NATURAL HISTORY READERS.

By the Rev. J. G. WOOD, M.A.,

Author of 'Homes without Hands,' etc.

SPECIALLY ADAPTED TO MEET THE REQUIREMENTS OF THE NEW CODE:

FIRST READER, 96 pp., cloth, 7d. | SECOND READER, 128 pp., cloth, 9d.
THIRD READER, 192 pp., cloth, 1s.

*** These Books have been specially and carefully prepared to meet the requirements of the New Code, both for Reading and for Class Subjects.

Specimen Copies free by post upon application.

WM. ISBISTER, Limited, 56, Ludgate Hill, London, E.C.

VINUM VITÆ,

Or WINE of LIFE, the GREAT HEALTH RESTORER. Is invaluable for curing Ague, Biliousness, Sick Headache, Sluggish Liver, Constipation, and Indigestion; giving Tone to the Stomach, Strength to the Nerves, Purity and Richness to the Blood. Beneficial to both Sexes. CHILDREN TAKE IT MOST READILY. Price 2/9 and 4/6. ONLY OF LEADING CHEMISTS, or from

HOLDEN & CO.,
6, PILGRIM STREET, LUDGTE HILL, LONDON, E.C.

LONDON SCHOLASTIC TRADING CO.,
LIMITED.

DEPARTMENTS.

Books	Furniture
Stationery	Needlework
Rewards	Printing

Catalogues Supplied and Estimates Furnished.

SOLE ADDRESS—
5, BRIDEWELL PLACE, NEW BRIDGE STREET, E.C.

DRAWING & PRINTING MATERIALS.

Liberal Allowance to Schools. Send for Illustrated Catalogue, Post Free.

BRODIE & MIDDLETON,
79, LONG ACRE, LONDON.

CIVIL SERVICE APPOINTMENTS.

Clerkships, Excise, Customs, etc. Candidates, rapidl prepared through the post.—J. KEEFE, F.S.A., etc., Civ Service Academy, 6, Colquitt Street. Liverpool.

The Eighth Edition, price 2s. 6d. KEY price 2s.

GREEK LESSONS,

SHOWING HOW USEFUL AND HOW EASY IT IS FOR EVERY ONE TO LEARN GREEK.

BY W. H. MORRIS.

MORRIS'S

ELEMENTA LATINA,

OR LATIN LESSONS FOR BEGINNERS.

Sixth Edition, price 1s. 6d.

'An admirable little book for beginners.'—*Educational Times.*

LONDON: LONGMANS AND CO.

SCHOLASTIC MUSICAL INSTRUMENT CO.

(ESTABLISHED 1871).

To supply Teachers, School Board Members, and School Managers with ANY kind of Musical Instrument from ANY Maker at bona fide Trade Price for Cash, or by Easy Instalments.

Every one should read our Circular and Extracts, which are sent Post free.
Apply to the MANAGER, 39 Oseney Crescent, Camden Road, N.W.

'We have now had plenty of time to try the piano; and I can say to you how very much we are pleased with it, and how greatly I am obliged to you for procuring me so excellent an instrument so cheap.'—MATTHEW ARNOLD, Esq., H.M.I.

'You are at liberty to make any use of my wife's and my own opinion—that the piano is excellent both for tone and touch, and that it is a very cheap piano.'—Rev. T. W. SHARPE, M.A., *H.M.I. for Training College for Schoolmasters.*

15,000 similar Testimonials have been received from all parts of the country, from H.M. Inspectors, Assistant Inspectors, Presidents of N.U.E.T., Principals and Masters of Training Colleges, Teachers and School Board Clerks.

THE ONLY ADDRESS IS
39 OSENEY CRESCENT, CAMDEN ROAD, LONDON, N.W.

T. GREENWELL,
MANCHESTER.

ESTABLISHED 1840.

GREENWELL'S TEST CARDS
IN
ALGEBRA, EUCLID, & MENSURATION.

BY M. H. SENIOR.

For Oxford and Cambridge Juniors, and for the Higher Grade Schools. Adapted also to the requirements of the New Code, 1882-3.

In Three Packets (with Ans. Cards), 1s. each.

MY FIRST ALGEBRA.

BY M. H. SENIOR.

ADDITION, DIVISION, FACTORS.

48 pages, Foolscap 8vo,

Price 3d., Separate Answers, 2d.

A most indispensable help to the thorough mastery of the Elements of Algebra. The only Elementary Algebra giving a full and easy exposition of Factors.

GREENWELL'S NEW SCHOOL REGISTER
OF
ATTENDANCE & FEES, 1s. each.
SUMMARY to Ditto, 1s. 6d.

Printed from engraved Copper Plates.

LONDON: SIMPKIN, MARSHALL & CO. WHITTAKER & CO.

IMPORTANT TO ALL!

JOHNSON'S ANTI-PHTHISIS YARN
(REGISTERED),

A FINE SPUN WOOL FOR LADIES', CHILDREN'S, & GENTLEMEN'S HOSIERY, TO PREVENT & ALLEVIATE CONSUMPTION AND DECLINE.

By the constant use (Spring, Summer, Autumn, Winter) of this invaluable and beautiful Yarn, Consumption and Decline, and all disorders of the breath and lungs, may not only be prevented, but in their worst forms alleviated; and where a cure can be effected its use is of priceless value as an auxiliary to the medical man's treatment.

An eminent physician, writing privately to Mr. Johnson, says:—"Though I am clearly and distinctly against giving public testimonials to anyone, yet it gives me great pleasure to inform you, privately, of the very high opinion I have of your Anti-Phthisis Yarn. I can honestly say that JOHNSON'S ANTI-PHTHISIS YARN is a real blessing to all who use it, and it were well if all classes would use it both in summer and winter. Nothing can be better. I use it myself, and have seen it extensively used by my patients with the greatest possible benefit to them. You may be sure I will do all in my power to recommend such a valuable article."

In hanks, 1s. 3d. each, or in 14s. boxes, containing 12 hanks. Carriage paid to all parts of England, Scotland, Ireland, and Wales. Made in Black, White, and all colours. Single hank sent, carriage paid, to your door for 1s. 3d. JOHNSON'S ANTI-PHTHISIS YARN can only be had from the sole proprietor and producer,

WILLIAM JOHNSON, 80, NORTH END, CROYDON, LONDON, S.E.

ESTABLISHED 1851.

BIRKBECK BANK.—Southampton Buildings, Chancery Lane.

Current Accounts opened according to the usual practice of other Bankers, and Interest allowed on the minimum monthly balances when not drawn below £25. No commission charged for keeping Accounts.

The Bank also receives money on Deposit at Three per cent. Interest.

The Bank undertakes for its Customers, free of charge, the custody of Deeds, Writings, and other Securities and Valuables; the collection of Bills of Exchange, Dividends and Coupons; and the purchase and sale of Stocks and Shares. Letters of Credit and Circular Notes issued.

A Pamphlet, with full particulars, on application.

March 1880. FRANCIS RAVENSCROFT, Manager.

The Birkbeck Building Society's Annual Receipts exceed Four Millions.

HOW TO PURCHASE A HOUSE FOR TWO GUINEAS PER MONTH, with immediate Possession and no Rent to Pay. Apply at the Office of the BIRKBECK BUILDING SOCIETY.

HOW TO PURCHASE A PLOT OF LAND FOR FIVE SHILLINGS PER MONTH, with immediate possession, either for Building or Gardening purposes. Apply at the Office of the BIRKBECK FREEHOLD LAND SOCIETY.

A Pamphlet, with full particulars, on application.

FRANCIS RAVENSCROFT, Manager.

Southampton Buildings, Chancery Lane.

A CHEST of TEA for 30/-

Containing **16** *lbs. net of* **PURE INDIAN TEA**

(1/10½ per lb., worth 3/- retail). Cash with Order. Carriage not paid. Quarter-pound Sample by post for Nine Stamps.

TRADE MARK.

JOHN MIXER & CO.,
94, Newgate St.,
LONDON, E.C.

ESTABLISHED 1854.

Just published, in fcp. 8vo, price 3s. 6d. cloth.

GRAMMAR OF ELOCUTION

By JOHN MILLARD,

Elocution Master in the City of London School.

Second Edition, Revised.

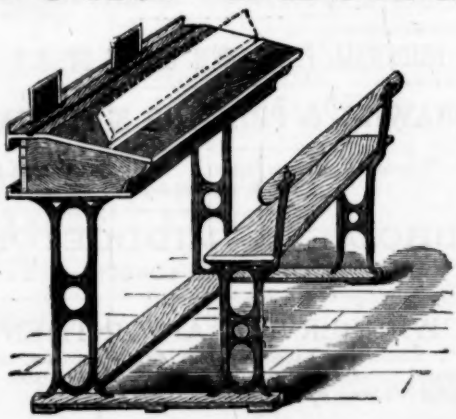
'The second and revised edition of a work of which the principles are thoroughly sound. That elocution—intelligent elocution, not the stilted form of speech and action which is, or used to be, dinned into boys for speech-days—should be far more widely taught in our schools than it is few people will deny. To judge from his book, Mr. MILLARD should be as good a master as could be desired for the acquirement of what ought to be elementary rules, as well as for further niceties which follow naturally on the acquaintance with these rules. Mr. MILLARD'S illustrations are capitally chosen, and one sentence from his book, accompanying a quotation exactly fitted to its purpose, will show those who have any care for the subject that the Author knows remarkably well what he is about:—*In such sentences as the above, nothing is more common than for a reader, especially if he is reading at sight, to drop his voice where a sense, but not the sense, is formed. Such a reader should be told to keep his eye well in advance of his voice.*'

SATURDAY REVIEW.

London: LONGMANS & CO.

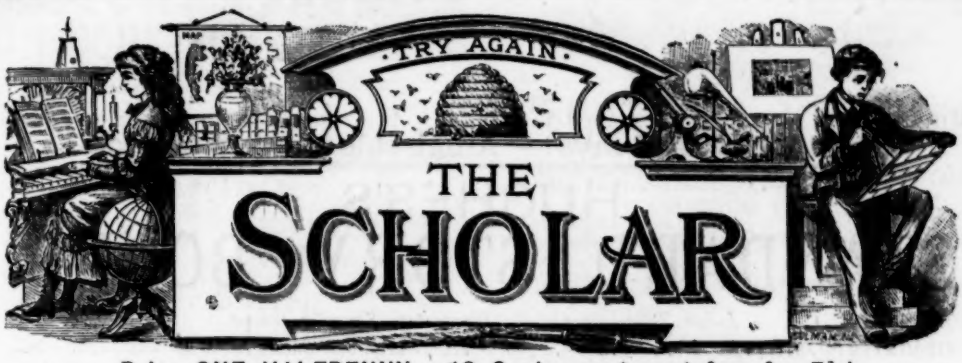
BORD'S PIANOS
ON SALE
WITH 25 PER CENT DISCT FOR CASH,
OR 15s PER MONTH ON THREE YEARS' HIRE SYSTEM,
SECOND HAND ON 3 YEARS' SYSTEM 10/6
PER MONTH ILLUSTRATED LIST FREE OF
PIANOS EXCHANGED
Chas. Stiles & Co
42 SOUTHAMPTON ROW, HOLBORN, LONDON W.C.

EDWARDS'
NEW
DUAL DESKS.



See ADVERTISEMENT

Page 2 of Wrapper.



Price ONE HALFPENNY. 13 Copies sent post-free for 7½d.

May be obtained through any Bookseller.

The FIRST VOLUME *of* 'THE SCHOLAR' *is now READY.*

Price, in neat wrapper, 6d. Post Free 7½d.

It is believed that no Inspector will decline to accept 'The Scholar' as a Reading Book for the Upper Standards.

CHIEF CONTENTS.

1. **SEVEN 'STORIES FROM ENGLISH HISTORY.'** By the Rev. Sir G. W. Cox. With Illustrations by Gunston.
2. **EIGHT LIVES OF POETS.** By J. S. FLETCHER.— Shakspere, Milton, Longfellow, Wordsworth, Goldsmith, Byron, Shelley, and Cowper—with Portraits and Choice Extracts from their Works.
3. **EIGHT DESCRIPTIONS OF BRITISH RIVERS**—Thames, Severn, Trent, Yorkshire Ouse, Great Ouse, Tyne, Tweed, and Clyde (with MAPS).
4. **A COURSE OF ALGEBRA,** up to Division inclusive. By W. H. HARVEY, B.A.
5. **THIRTY LESSONS IN DOMESTIC ECONOMY.** By Mrs. WIGLEY.
6. **ARITHMETICAL QUESTIONS FOR STANDARDS III.-VII.** By. W. SPENCER.
7. **SIXTEEN FREEHAND DRAWING COPIES.** By W. H. HARVEY, B.A.
8. **EIGHT SCHOOL SONGS,** in both Notations. By T. CRAMPTON.
9. **EXPLANATORY LISTS** of all the more difficult words occurring in the Volume.
10. **SELECTION FROM THE PRESS.**
11. **ANSWERS TO THE ALGEBRA AND ARITHMETIC QUESTIONS.**

The Volume altogether forms one of the MOST COMPREHENSIVE AND INSTRUCTIVE yet offered to the young.

Volume II., the first number of which will appear on October 20, will contain, amongst other useful matter, Articles on Animal Physiology, and a splendidly illustrated School Edition of the Life and Adventures of Robinson Crusoe, both specially arranged to suit the requirements of the New Mundella Code.

LONDON: JOSEPH HUGHES, PILGRIM STREET, LUDGATE HILL, E.C.

The *SCHOOLMASTER* says:—'Admirable in every respect.'

HUGHES'S
STANDARD STORY BOOKS.

Large Type—Beautifully Illustrated—Strongly Bound.

STORIES FOR INFANTS, 64 pp. ... ... 4d.	*STORIES FOR STANDARD III., 160 pp. ... ... 10d.*
STORIES FOR STANDARD I., 96 pp. ... ... 6d.	*STORIES FOR STANDARD IV., 224 pp. ... ... 1s.*
STORIES FOR STANDARD II., 128 pp. ... ... 8d.	*STORIES FOR STANDARD V., 288 pp. ... ... 1s 6d.*

STORIES FOR STANDARD VI., 320 pp., 2s.

☞ *These books exactly fulfil the conditions of ordinary Readers as set forth in the recently issued 'Circular to Inspectors.'*

OPINIONS OF THE PRESS.

THE TEACHER says:—'We praised with unusual warmth the earlier books, and are pleased to find that the latest addition is worthy of its predecessors. We have in this book stories of famous London buildings, of travel, of animals, of heroes, and stories from English and Scotch history. We congratulate Mr. Hughes on the excellence of the "Stories," and we congratulate the children into whose hands they may fall.'

THE IRISH TEACHERS' JOURNAL says:—'The stories are not only interesting, but are, at the same time, well worth remembering. The pupil who reads of the Adventures of Alfred, the Death of Harold, the Adventures of Robin Hood, the Battle of Crecy, the Loss of the White Ship, and similar stories, is not likely to rest satisfied until he acquires a more extensive knowledge of the history of his country. But the stories are in sufficient variety to suit the tastes of readers having no love for history. Geography, Natural History, Biography, and Domestic Economy have been laid under contribution, in order to furnish materials for one of the most charming Readers which can possibly be placed in the hands of an intelligent boy or girl.'

THE SCHOOLMASTER says:—'They are original, interesting, and attractive, and cannot fail to create a love for reading. They only require to be known to be appreciated.'

PAPERS FOR TEACHERS says:—'They are charmingly written.'

THE SCHOOL AND UNIVERSITY MAGAZINE says:—'Deserve our highest commendation, and we unconditionally accord it to them. Worthy of the young and enterprising publishing house whose imprint it bears.'

THE SCHOOL BOARD CHRONICLE says:—'They cannot hardly fail to be favourite reading with the little ones.'

THE SCHOOL GUARDIAN says:—'Just the sort of book to make a child try to read it for the amusement it affords. The point of all the tales is to teach kindness to animals—a most necessary lesson for young children, which could not be better enforced than it is here.'

THE JOURNAL OF EDUCATION says:—'They are marvels of cheapness. The selection of poetry seems to us particularly happy.'

THE TEACHER'S ASSISTANT AND STUDENT'S MAGAZINE says:—'Not only suitable language, but suitable thoughts and subjects are pressed into the service, if we may say so; and the result is Story Books which children, as soon as they begin to read at all, will love to read on every opportunity.'

THE SCHOLASTIC WORLD says:—'Intended to make the path of reading as pleasant as possible to little learners. The stories are well written and interesting, and the language is carefully graduated. The series, so far, leaves little, if anything, to be desired, and is sure to become popular, both for home and school reading.'

THE EDUCATIONAL NEWS (Scotland) says:—'Exactly such a book as an intelligent child would choose for its own reading.'

THE EDUCATIONAL CHRONICLE says:—'The arrangement and construction of these books have been carried out with utmost care. In the volume now before us (Standard V.) these features of excellence have been equally well sustained. In addition to the "Stories of Famous London Buildings," "Stories from English and Scottish History," and "Stories of Travel, of Animals, and of Heroes," we are pleased to see a Domestic Economy Lecture, the four chapters of which are certain to prove attractive reading, for the girls especially. We cordially recommend the series.'

A FEW UNSOLICITED TESTIMONIALS FROM TEACHERS.

'They have no rival, I think, in the school-book market.'
Mr. GEO. ATKINSON, Noble Street School, Bolton.

'My expectations have been greatly surpassed. I am quite sure from their interesting and varied contents, that the dullest children with these books will be incited to take a newer and livelier interest in their reading lessons.'
Mr. T. C. ELLIOT, Springfield Board School, Sheffield.

'I think Standard III. excellent.'
Miss CRADDOCK, Head Mistress, Albany-rd. Bd. Sc., London.

'I consider it (Standard V.) an excellent book.'
Mr. MOSSFORD, Head Master, Woolmore-st. Bd. Sc., Poplar, London.

'Thanks for your Standard V. Story Book. It is an excellent book: the children prefer it to any of their other Readers.'
Mr. DUNMON, Head Master, Crown-st. Bd. Sc., Soho, W.C.

'I cordially approve of them.'
Mr. S. H. WALSH, St. Paul's Schools, Bolton.

'Charming Story Books. They almost make me wish that I were a youngster again, so that I might have the pleasure of learning to read from them.'
Mr. WALKER, Cathedral Boys' School, Ripon.

'Will make an excellent second set.'
Mr. A. GARDNER, Head Master, Board School, Leeds.

'I cannot conceive a set of books that can in any way bear comparison with them for the purpose designed—teaching to read. Every line is full of interest and delight.'
Mr. JAMES, British School, Hadleigh, Suffolk.

'The best I have seen.'
Mr. SAUNDERS, Ashburnham School.

'I cannot help expressing my great pleasure at making their acquaintance. They are equal, as ordinary school Readers, to any now in the market, but as supplementary Readers they will be invaluable, being so well calculated to relieve the tedium of school drudgery.'
Mr. MOULD, Brayton School, Selby.

'I think they are capital; but the strongest testimony I can give you as to their answering the purpose for which they were written is to be found in the avidity with which my children read them.'
Mr. STATHER, Hillhouse Board Schools, Huddersfield.

*** *SPECIMENS SENT POST FREE.*

London: JOSEPH HUGHES, Pilgrim Street, Ludgate Hill, E.C.

THE

SCHOOL OF ART DRAWING COPY-BOOKS,

DISTINGUISHED FOR

Careful Graduation,

Convenient Shape and Arrangement, and

Superior quality of Paper.

FREEHAND.

By the Rev. C. G. BROWN, B.A., Principal of Carmarthen Training College.

In Six Books, price 3d. each.

PERSPECTIVE.

By the Rev. HENRY LEWIS, M.A., Principal of Culham Training College.

In Six Books, price 4d. each.

GEOMETRY.

By E. SWEETING, Head-Master, William Street Board School, London.

In Six Books, price 3d. each.

'All the figures are very neatly drawn and most carefully graduated. The paper also is excellent. This series deserves a high meed of praise.'—*The Schoolmaster.*

'The copies selected are exactly those that we should wish to put into the hands of young pupils, and they have been graduated with the utmost care.'—*The School Guardian.*

'The books before us have the merit of being not only cheap, but good.'—*Educational Times.*

'The gradations are so easy that the pupil must have a sense of mastery at every step of his progress. The paper is the very best; and the figures perfect of their kind.'—*Educational News.*

☞ *Specimens free to Teachers of Drawing.*

LONDON:

JOHN WALKER & CO., 96, FARRINGDON STREET.

JOHN HEYWOOD,

Educational Publisher, Wholesale Bookseller, Stationer,

CHURCH & SCHOOL FURNITURE MANUFACTURER,

EXCELSIOR BUILDINGS, RIDGEFIELD, AND DEANSGATE, MANCHESTER.

THE FOLLOWING CATALOGUES WILL BE SENT, POST-FREE, ON APPLICATION.

I.—A CATALOGUE OF

EDUCATIONAL & MISCELLANEOUS WORKS,

Containing a list of John Heywood's own distinctive Publications. This will be found to embrace a great variety of Educational Works (written mainly by practical authors), and from it heads of schools and others may select books in almost every branch of study.

II.—AN ILLUSTRATIVE CATALOGUE OF

CHURCH AND SCHOOL FURNITURE,

A Handy Guide for Architects and Builders of Schools, as well as for the Clergy, School Boards, School Managers, and Teachers.

III.—A CLASSIFIED AND

ILLUSTRATED EDUCATIONAL CATALOGUE,

Containing a general list of the leading School Books published, together with the most commonly used articles in Stationery and Materials.

IV.—A CATALOGUE OF

JUVENILE AND OTHER WORKS,

Suitable for Presents, Prizes, Libraries, and General Reading.

V.—A CATALOGUE OF

DRAWING MATERIALS,

Comprising Oil and Water-Colour Paints, Colour Boxes, Oil and Varnishes, Brushes, Canvases, Academy and Millboards, Blocks, Drawing Boards, Mathematical Instruments, with every variety of Material to meet the requirements of Artists.

VI.—A CATALOGUE OF

BOOKS AND PAMPHLETS,

Containing Dialogues, Lectures, and Recitations, some of which are in the Lancashire Dialect, suitable for Public Readings and Private Entertainments.

London Warehouse—11, Paternoster Buildings.

Announcements by the North of England School Furnishing Co., Limited.

NOW READY,

WHAT HER MAJESTY'S INSPECTORS SAY.

The Third Year (1882) of Publication, and dedicated by special permission to the Right Hon. A. J. MUNDELLA, contains the

CLASSIFIED REPORTS

of the following Inspectors for

ENGLAND AND WALES, AND SCOTLAND.

C. ALDERSON, Esq., Marylebone.
M. J. BARRINGTON-WARD, Esq., Bromsgrove.
Rev. H. B. BARRY, Bath.
E. H. BRODIE, Esq., Worcester.
C. W. COLLINS, Esq., Peterborough.
W. SCOTT-COWARD, Esq., Warrington.
A. DEY, Esq., in South Forfarshire.
C. H. B. ELLIOTT, Esq., Lincoln.
J. D. B. FABER, Esq., Warwick.
Rev. S. J. G. FRASER, parts of Dorset, Hants, Somerset, and Wilts.
F. A. S. FREELAND, Esq., Bury.
A. P. GRAVES, Esq., Huddersfield.
H. E. B. HARRISON, Esq., Liverpool.
E. M. KENNEY-HERBERT, Esq., Aylesbury.
Rev. R. L. KOE, Brighton.
J. W. MARSHALL, Esq., Ayrshire.
Rev. G. R. MONCREIFF, Bristol.
H. E. OAKELEY, Esq., Manchester.
R. OGILVIE, Esq., in the Counties of Dumbarton, etc.
E. L. PHELPS, Esq., Wigan,
E. S. MOSTYN PRYCE, Esq., Newport (Mon.).
D. ROSS, Esq., in the Counties of Renfrew, etc.
H. B. ROWAN, Esq., Colchester.
W. SCOLTOCK, Esq., Birmingham.
A. E. SCOUGAL, Esq., in the Counties of Berwick, etc.
Rev. C. SEWELL, Nottingham.
D. SIME, Esq., in Caithness, etc.
Rev. H. SMITH, King's Lynn.
S. N. STOKES, Esq., Southwark.
R. P. A. SWETTENHAM, Esq., Darlington.
Rev. R. TEMPLE, Montgomeryshire, Salop, and the adjoining Counties.
E. W. COLT-WILLIAMS, Esq., Radnor and Hereford.
C. E. WILSON, Esq., LL.D., in the Counties of Edinburgh, etc.

A HISTORY of the EDUCATIONAL CODES,

AND A

PORTRAIT OF THE RIGHT HONOURABLE A. J. MUNDELLA, M.P.

PRICE 1s. NET: FREE BY POST, 15 PENNY STAMPS.

TRIENNIAL VOLUME OF 'WHAT HER MAJESTY'S INSPECTORS SAY:'

Being the Issues for 1880, 1881, and 1882. The Publishers have bound in cloth a limited number for the convenience of reference. Price 3s. 6d.

THE NEW INSTRUCTIONS TO HER MAJESTY'S INSPECTORS.

PRICE 2d.; FREE BY POST, 2½d.

THE 'COMPLETE' CLASS REGISTER OF ATTENDANCES AND SCHOOL FEES.

Extract from the New Instructions to Her Majesty's Inspectors:—'It must be clearly understood that irregularity of attendance, unless it is produced by some of the causes which constitutes a reasonable excuse for absence, cannot be accepted as an excuse for the want of progress of any scholar. IT HAS NOW BECOME THE INTEREST OF ALL CONCERNED IN THE PECUNIARY RESULTS OF THE ANNUAL EXAMINATION TO INCREASE THE AVERAGE YEARLY ATTENDANCE BY DIMINISHING DAILY IRREGULARITIES.'

The 'COMPLETE' CLASS REGISTER, by the provision of a column in which to enter every week THE TOTAL ATTENDANCES MADE UP TO DATE, enables the Teacher to WATCH the attendance of each Scholar. The slight increase of work EACH week—scarcely perceptible—is more than compensated by the IMMENSE SAVING OF LABOUR at the END of the quarters and the CLOSE of the year, and the ABSOLUTE ACCURACY OF THE REGISTRATION.

PRICES.

25 Names, cloth, 1s.; paper boards, 8d.; paper .. .. .. 5.
50 ,, 1s. 4d.; ,, 1s.; ,, ... 9d.

PUBLISHED BY

The North of England School Furnishing Company, Limited,

Educational Publishers, Booksellers, and School Furniture Makers

(Makers of the noted DARLINGTON SLATEBOARDS),

NEWCASTLE & DARLINGTON.

LONDON AGENTS:

Jarrold & Sons, 3, Paternoster Buildings.

COLLINS' SCHOOL SERIES.

THE LATEST AND BEST COPY BOOKS PUBLISHED.

In Twelve Books, Foap. 4to, oblong, each 2d.

COLLINS' ROUND-HAND WRITERS.

Adapted to the latest requirements.

☞ This New Series has been prepared by one of the first practical Educationists of the day, a Gentleman of long and varied experience, and one who is thoroughly conversant, not only with the WANTS OF TEACHERS, but also the REQUIREMENTS OF H.M. INSPECTORS. The Series has already been approved by the School Boards for London, Bradford, Huddersfield, Aston, Gateshead, Exeter, Bristol, Todmorden, etc.

'A round commercial hand, both for boys and girls, always gains the best mark in our Examinations.'—Mr. MOSTYN PRYCE, in the EDUCATIONAL BLUE BOOK for 1881-2, page 380 (Just published).

'One of the best in the market.'—THE SCHOOLMASTER.
'A very good set of copy books.'—SCHOOL BOARD CHRONICLE.
'Are everything that can be desired.'—THE SCHOOLMISTRESS.
'This is a good series.'—THE SCHOOL GUARDIAN.

*** *Book of Specimen Pages post free to Head Teachers; or, Sample Set sent post free for Two Shillings.*

Reading Books for the Upper Standards.

'In Standards V., VI., and VII., books of extracts from Standard Authors may be taken; .....Biographies of eminent men (if of suitable length) are to be preferred. In Standards VI. and VII. a single play of Shakespeare, or a single book of one of Milton's longer poems, may be accepted.'—EXTRACT FROM NEW INSTRUCTIONS TO H.M. INSPECTORS.

SHAKESPEARE & MILTON READERS.

ADOPTED BY THE LONDON SCHOOL BOARD.

With Introductory Remarks, Explanatory, Grammatical, and Philological Notes, etc. Fcap. 8vo, cloth, 1s. each.

SHAKESPEARE.

Tempest. By Rev. D. MORRIS, B.A.
Merchant of Venice. By Rev. D. MORRIS.
Richard II. By Rev. D. MORRIS.
Richard III. By WM. LAWSON, F.R.G.S.
Henry V. By S. NEIL, F.E.I.S.
Henry VIII. By WM. LAWSON.
King Lear. By Dr. W. B. KEMSHEAD.
Macbeth. By SAMUEL NEIL.
As You Like it. By S. NEIL.

SHAKESPEARE.

Julius Cæsar. By SAMUEL NEIL.
Coriolanus. By JAS. COLVILLE, M.A.
Romeo and Juliet. By SAMUEL NEIL.
Hamlet. By S. NEIL.
Midsummer Night's Dream. By S. NEIL.
King John. By Rev. F. G. FLEAY

MILTON.

Paradise Lost. Books I. and II.
Comus, Lycidas, Il Penseroso, and L'Allegro. By J. G. DAVIS.
Paper boards, 9d.; cloth, 1s.

'The high reputation won by the well-known series of Messrs. Collins, which is doing so much to bring an appreciative and scholarly knowledge of our English classics within the reach of the youth of to-day.'—*Edinburgh Educational News.*

ENGLISH CLASSICS.

With Introduction and Notes. Fcap. 8vo, stiff cover.

ADOPTED BY THE LONDON SCHOOL BOARD.

COLERIDGE—
Ancient Mariner, and other Poems .. .. .. 2d.
WORDSWORTH—
Lyrical Ballads .. .. 2d.
Excursion, Book I... .. 3d.
,, Book III. .. 2d.
MILTON—
Paradise Lost, Book I. .. 2d.
,, Book II. .. 3d.
,, Book X. .. 3d.
Comus .. .. 3d.
Samson Agonistes .. .. 4d.
CAMPBELL—
Pleasures of Hope .. .. 2d.
SELECTED POETRY—
Comprising 'John Gilpin,' and other standard pieces. 32 pp. .. .. .. 2d.
POPE—
Essay on Man .. .. 3d.
GOLDSMITH—
Traveller and Deserted Village .. .. 2d.
COWPER—
The Task, Book I. .. .. 2d.
SCOTT—
Lady of the Lake, Cantos I. and II. .. .. .. 3d.
Ditto, Canto V. .. .. 2d.
Lay of the Last Minstrel, Cantos I. and II. .. .. 2d.
GRAY—
Odes and Elegy .. .. 2d.
BYRON—
Childe Harold, Canto IV. Stanzas 1—48 and 140—186, 4d.; cloth .. .. 6d.

Readings in English Literature—Prose. Being Selections from the best English Authors from the Fourteenth to the Nineteenth Century. Extra fcap. 8vo, cloth, 256 pp., 1s. 6d.

Eminent Writers in English Literature. A Series of Forty-one Biographical Sketches. By WILLIAM LAWSON, F.R.G.S. Extra fcap. 8vo, 264 pp., 1s. 6d.

The Model Elocutionist. A Manual of Instruction in Vocal Gymnastics and Gesture. With Illustrative Diagrams and numerous Readings and Recitations. By ANDREW COMSTOCK, M.D., late Professor of Elocution, Philadelphia; and JAMES ALLEN MAIR. Extra fcap. 8vo, cloth, 250 pp., 1s. 6d.

ADOPTED BY THE LONDON SCHOOL BOARD.

Outlines of Political Economy, for Schools, presenting a clear statement of the leading principles of Political Economy; and such an explanation of them as the young may easily understand. By A. H. DICK, M.A., LL.B. Extra fcap. 8vo, cloth, 160 pp., 1s.

ADOPTED BY THE LONDON SCHOOL BOARD.

Lessons in Domestic Economy, for Elder Girls and Pupil Teachers. By JOSEPH HASSELL, Associate of King's College, London, and Lecturer at the Home and Colonial Society's Training College. *Thirty-fifth Thousand.* Illustrated, fcap. 8vo, cloth, 1s.

SCIENTIFIC READERS (See Circular to H.M.I.).

Outlines of Natural Philosophy. Adapted for Upper Classes in Elementary and Middle-class Schools. By B. SIMPSON, London. Illustrated, extra fcap. 8vo, 190 pp., 1s.

ADOPTED BY THE LONDON SCHOOL BOARD.

Outlines of Natural History. Embracing the Mineral, Vegetable, and Animal Kingdoms, and intended to assist the youthful scholar in beginning for himself a course of observations upon the natural objects around him. By A. H. DICK, M.A., LL.B. Illustrated, extra fcap. 8vo, cloth, 192 pp., 1s.

*** *SPECIMEN VOLUME (EXCEPTING BYRON) AT HALF PRICE TO HEAD TEACHERS.*

WILLIAM COLLINS, SONS, AND COMPANY, LIMITED,

GLASGOW: 139, Stirling Road. | **LONDON:** Bridewell Place, E.C. | EDINBURGH: The Mound.